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Experimenting with Foods and Sleep. I. Effects of Varying Types of Food in Offsetting Sleep Disturbances Caused by Hunger Pangs and Gastric Distress—Children and Adults

DONALD A. LAIRD AND HILDA DREXEL

Organic Acids and the Acid Base Relationship. Oxalic Acid in Foods

E. F. KOHMAN

Newer Trends in Nutrition

SYBIL L. SMITH

Personnel Procedure within the Dietary Department

J. W. VANDEN BOSCH

Vitamin Studies on Apples. I. The Vitamins A, B and C Content of the Rome Beauty, Delicious, Stayman, Yellow Newtown and Winesap

IRA A. MANVILLE, AVOCA S. McMINIS AND FRITZI CHUINARD

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EXPERIMENTING WITH FOODS AND SLEEP

1. Effects of Varying Types of Food in Offsetting Sleep Disturbances Caused by Hunger Pangs and Gastric Distress—Children and Adults[1]

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SLEEPING and eating are two rather basic activities of human beings which may possibly be more intimately connected with each other than is ordinarily thought. Drowsiness following overeating on Sunday, of course, is commonplace and may suggest some relation between sleep and eating habits, as does the nap the household dog takes in front of the fire after his meal.

HUNGER CONTRACTIONS AND SLEEP

The biological need for food and the biological need for sleep may at times conflict, due to the interesting nature and timing of contractions of the walls of the stomach. These automatic hunger contractions, the more intense of which we sense as "hunger pangs," appear shortly after the stomach is emptied of food. Four to five hours after an ordinary meal these recurrent hunger spasms of the stomach announce themselves. Starting at the heart end of the stomach, according to the summaries of A. J. Carlson (2), they spread their rather violent wave of contraction progressively to the small intestine end of the stomach—exactly the opposite of the direction in which the gentle and rhythmic contractions of digestion pass along the stomach walls.

It has been found by many workers that these hunger contractions are entirely automatic; we cannot at will either start or stop them. They are more frequent during sleep than while we are awake, and according to

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W. B. Cannon (1) they may recur every three or four minutes after the stomach is emptied of food from the last meal.

Like most stimuli from man's internal organs, the visceral tensions set up by hunger pangs are known to increase reflex excitability, even in animals that have been surgically deprived of the brain. A. J. Carlson and C. A. Johnson have recently found that the amplitude of the knee-jerk is increased when the tap below the patella is given simultaneously with the appearance of a hunger contraction, just as the lowly stentor is more active when hungry (6).

Since the greater part of the sleep period of human beings, both children and adults, is spent with the stomach empty, it might be suspected that unsensed hunger pangs constitute a disturbance of sleep. Consider: reflexes are normally diminished during sleep, yet hunger pangs, which are more frequent during sleep, increase reflex excitability. These two basic needs thus appear from theoretical considerations to be in conflict, so that hunger robs sleep of some of its soundness, especially in the later part of the sleep period.

These theoretical considerations are confirmed in the experimental work of Tomi Wada, who obtained a record of the sleep movements of subjects who before going to bed had swallowed rubber balloons connected with apparatus which recorded hunger contractions on the same kymographic tape that recorded the body movements. She found that many of the major movements made during sleep took place at the height of a hunger contraction (9).

GASTRIC DISTRESS AND SLEEP

Hunger contractions thus being fingerprinted as an enemy of sleep, the practical question arises of whether or not eating shortly before going to bed will delay their appearance and thus improve the quality of sleep. But the problem is not so simple as the words in which it can be stated. The secretion of gastric juices, for instance, is greatly diminished during sleep, as Henning and Norpoth showed in 1933 (5). The fact that some foodstuffs are inclined to ferment also complicates a simple solution of the problem since "minor degrees of fermentation, which produce no pain nor pressure symptoms, are capable of interfering with sleep" (4).

Thus, although foods in the stomach delay the onset of hunger pangs, it is obvious that some foods are more suitable for this use than others. Foodstuffs are indicated which do not require large amounts of gastric juices for their digestion, as well as foods which have little tendency to

fermentation (3). The lowered rate of circulation during sleep also makes it essential for foods to be used that take a minimum of digestive effort.

The present experiments were planned to measure to what extent the quality of sleep could be improved by two general classes of foods eaten before going to bed. The mere presence of food should delay hunger pangs and improve the sleep quality, but "hard to digest foods" should perhaps disturb sleep enough to offset the gain from delayed hunger pangs. Accordingly, two types of meals, or lunches, were used with our experimental subjects. For the light, "easy to digest" meal corn flakes was used, while a variety of foods, especially those rich in hemicellulose, were used for the "hard to digest" meals (7).

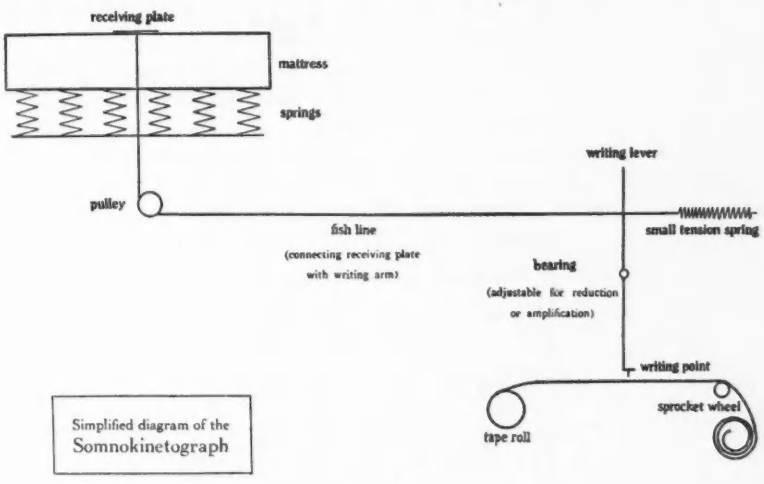


FIG. 1

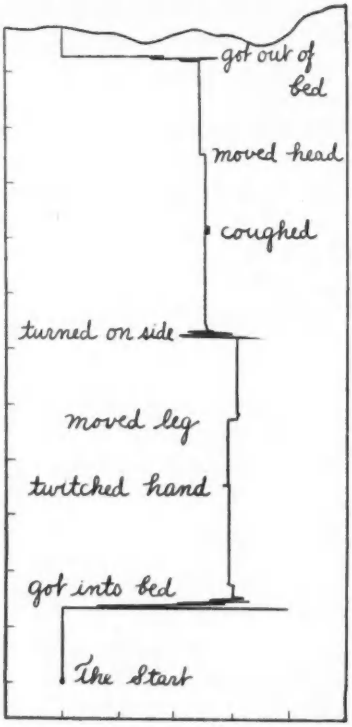
METHODS OF THE EXPERIMENTS

Eight healthy young men and 8 healthy children, from $4\frac{1}{2}$ to 8 years of age, were studied, from 6 to 8 weeks' data being obtained from each subject. The investigation covered a period of 5 months, data being gathered every day during this period, including Sundays.

Children were included in the study because hunger pangs are more marked with them. The study was made during the cold months when the hunger contractions are also augmented by the external cold. During the experimental periods the children lived and ate in their own homes

and slept in their own beds. The young men worked and ate in their accustomed places, but slept in the sleep laboratory at Rivercrest.

Sleep quality was measured by movements made during the night. A small brass plate placed on top of the mattress was connected by light drill rod and fish line to a recording somnokinetograph (see Figure 1).



Specimen Record

FIG. 2

The somnokinetograph, which can be adjusted to record breathing, was individually adjusted for each subject so that, when flat on the back, a movement so slight as shifting the hand by 2 inches, or turning the peripheral rim of the axis of the head 1 inch, would record as a deviation of $\frac{1}{16}$ inch on the record line; with this adjustment the record of turning from the back to the side produced a deviation of approximately $1\frac{1}{4}$ inch in the record line (see Figure 2). The tape was fed at the rate of $\frac{3}{4}$ inch per minute.

In the sleep laboratory the somnokinetograph is placed in an instrument room beneath the sleeping chamber. In the children's homes it was placed beside the head of the bed. Telchron motors, type C2M, making no more noise than an electric clock, were used to propel the tape. When the children went to bed their mothers merely turned the switch that started the instrument operating. The children's instrument was enclosed in a protective framework lined with hardware cloth and decorated with cut-outs of Mickey Mouse. Without exception the children found it an interesting game to sleep for Mickey Mouse; their part of the game was to draw as straight a line as they could during the night for the little movie character. One afternoon 2 of the children gave a tea party to which they invited the experimenters and Mickey Mouse; the latter attended by proxy.

The children went to bed at their usual retiring hour. Children were chosen who no longer took naps, thus giving a record of their total sleep without the unknown variable of an afternoon nap to complicate the findings.

In tabulating the records the first half-hour is not included, since an unknown amount of being awake is included in this period. Three categories were used: (1) sleep on nights after their regular evening meal; (2) after an evening meal with corn flakes and milk as the principal dish, accompanied by varied but always "easy to digest" accessories; and (3) after a "hard to digest" meal made up principally of foods (a) slow to digest, (b) producing flatulence, and (c) diuretic foods.

RESULTS WITH CHILDREN

The average total movements made by the children in 8 hours are charted for the above 3 categories. (Hour-by-hour curves cannot be used since there are at least 2 types of sleepers, as is being reported elsewhere; diminuendo sleepers have the maximum movements per hour the first hour of sleep, and gradually decrease each hour of the night; crescendo sleepers have their fewest movements the first hour, gradually increasing through the night.) A varying number of nights enter into each record; after the fifth night of each category a running average was started for each child, and data were gathered on that variable until adding the record for an additional night did not alter the running average by more than 2 per cent. From 8 to 12 nights were necessary for reaching this stability (8). Records were obtained on Sunday nights, but are not included in the averages since Sunday night sleep is not fairly representative, due to the extreme physical inactivity on that day.

Records were obtained, also, but not included in the averages, when the subjects had colds, headaches, or had been disciplined, etc.

Most movements were made during the night when the children had the "hard to digest" supper, next most when on their regular supper; and fewest on the nights when corn flakes was the principal dish of the eve-

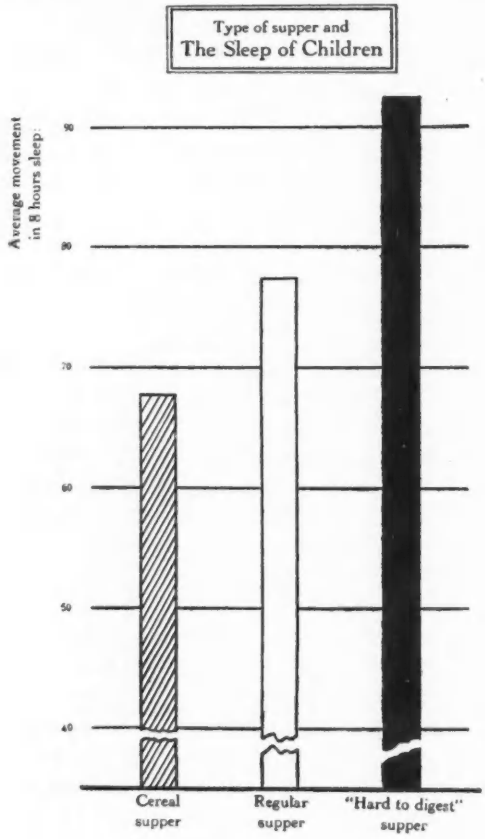


FIG. 3

ning meal. After the heavy meal they moved 19 per cent *more* than when their regular meal was eaten; when the cereal supper was eaten the children moved 26 per cent *less* than after the "hard to digest" meal. It is significant, however, that after the regular evening meals their movements were 14 per cent *more* numerous than during the nights when

the cereal supper was eaten; this suggests that the regular evening meals of these children, though of upper middle class families, tend to produce gastric distress during the night.

All of the children gave the same results, differing only in magnitude; all showed most movements after the "hard to digest" supper. *It is apparent that the food eaten at the last meal before retiring has a marked effect upon the quality of the sleep of children.*

This finding is crucial, since the bedtime hours of children, practically without exception, follow closely on the evening meal. With adults the situation may be somewhat different, since 4 to 5 hours usually lapse between the last meal and retiring, except in those instances when a bedtime snack is taken out of the pantry. Even in such instances a smaller quantity of food is ingested than at a regular meal. The work with adults, consequently, was confined to the variables of a bedtime snack.

RESULTS WITH ADULTS

The adults reported to the laboratory each evening at 10:15 and prepared for bed. At 10:30 the bedtime snack was served them, following which they went to bed. On control nights when no bedtime snack was served they retired at 10:45. Except for the fact that the late supper was omitted one-third of the nights, the variables and precautions were the same as with the children; records for sleep the night after an exciting football game, for instance, or during final examination period, are not included in the averages.

The chart of the averages for the adults shows the same tendencies that were found for the children, with the interesting feature that the two contrasting bedtime diets did not produce as great a difference in sleep as with the children, although the difference is one of practical significance. After the "hard to digest" late supper the adults' movements were increased by 6 per cent *more* than when no food was taken before retiring, and after the cereal—corn flakes and milk-supper they moved almost 6 per cent *less* than when no bedtime food was eaten. As was the case with the children's data, there were no individual exceptions to this tendency; all the adults, whether a "fast" sleeper averaging only 39 movements during the night or a "slow" sleeper moving 153 times, moved least when the cereal supper was eaten, and most when the "hard to digest" supper was used. And each of the adults moved least during their sleep when the cereal snack was used to delay hunger pangs, with a minimum likelihood of offsetting this utility by adding a factor of gastric distress.

Why the differences between the diets were more marked with the children raises some interesting and practical questions. Did the children's evening meal have a more marked effect on their sleep movements because, proportionately, they consumed a larger amount of food? Or

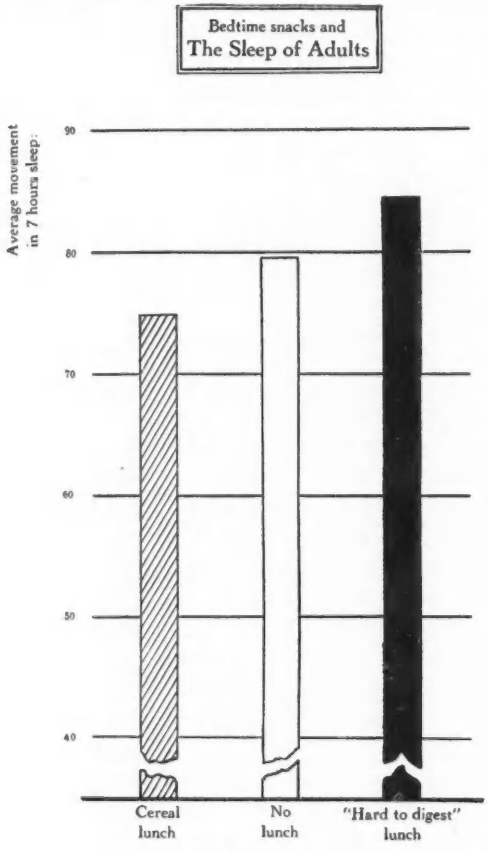


FIG. 4

was the difference due to some intrinsic physiological factors, related to the digestive functions and autonomic nervous system of children?

EFFECTS OF THE VARIABLES THROUGH THE NIGHT

Six of the adults were sleepers of the crescendo type, gradually gaining in restlessness during the course of the night. The hour to hour records

of their sleep movements were averaged, for each variable, to discover whether the basic theory underlying the work would be verified.

If the cereal snack benefited sleep by offsetting hunger pangs for four hours or so after the meal, we should expect to find the first half of the

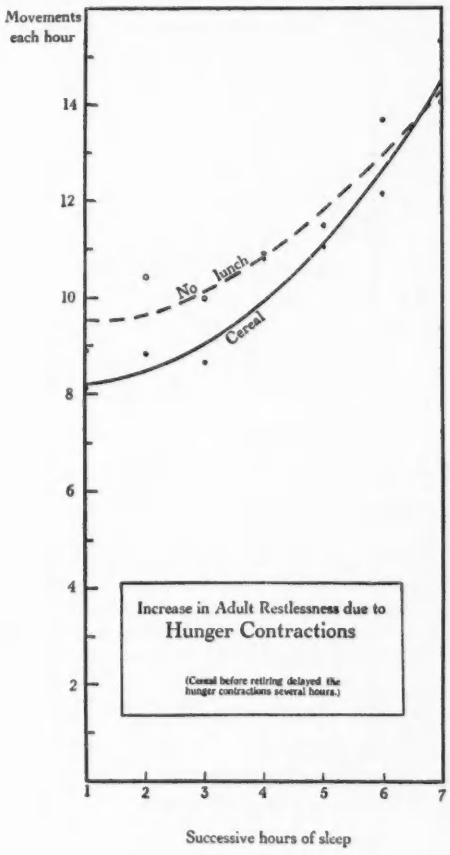


FIG. 5

night, when cereal was eaten, noticeably quieter than when no food was eaten just before retiring. The smoothed averages shown in Fig. 5 bear out this hypothesis; most of the improvement in sleep quality when the cereal is eaten, in contrast with no food, occurs in the first half of the night; the second part of the night the stomach is again empty, and cereal and no food variables show about the same sleep picture.

Both the cereal and the "hard to digest" snack delayed hunger pangs, so that the differences in sleep motility between these variables must be due principally to gastric distress caused by fats and the production of gases of fermentation. The averages in Fig. 6 reveal that gastric distress, even to the degree caused by the common foods used in the experi-

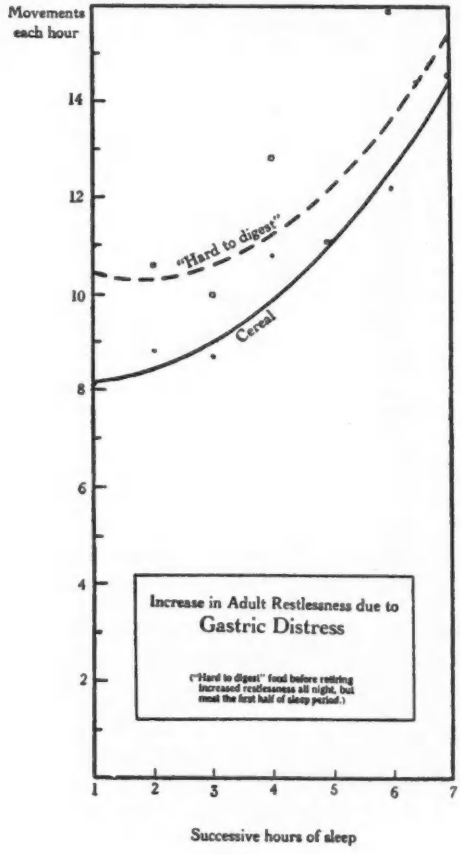


FIG. 6

ment, produces a great disturbance in sleep. These differences are not due to the quantity of foods, which were the same, but to the kinds of foods. The disturbing effect of gastric distress appears even the first hour, and in the greatest amount, gradually decreasing through the night, but is still present the last hour.

Although these data are from adults, their significance for child nutrition is paramount when we consider that the evening meal of young children is eaten just before they retire. As each week's dietary is scanned for balance, so should the evening menu each day be planned for freedom from gastric distress. (Data from the children cannot be given this hour-by-hour treatment, since there is not an adequate number of them of the same sleep type, but the implications from the last two charts of data are forcefully obvious.)

SUMMARY

A study of the movements of adults and children during sleep shows that eating before going to bed can improve sleep, if judgment is used in the selection of foods. Our 16 subjects slept best (with fewest movements) when a light meal of the familiar ready-to-eat cereals was taken before going to bed, and their sleep was disturbed more than normal for the subjects when a meal of "hard to digest" foods was the last meal before retiring. The sleep of children was affected by the nature of the last meal more than was the sleep of adults.

REFERENCES

(1) CANNON, W. B.: Bodily Changes in Pain, Hunger, Fear and Rage. New York: D. Appleton and Co., 1929
(2) CARLSON, A. J.: The Control of Hunger in Health and Disease. Chicago: University of Chicago Press, 1916
(3) COLLINS, J.: Insomnia. New York: D. Appleton and Co., 1930
(4) CRICHTON-MILLER, H.: Insomnia. London: Edward Arnold and Co., 1930
(5) HENNING, N. AND NORPOTH, L.: Investigations on secretory function of stomach during night sleep, Arch. f. Verdauungskr., 53:64–86, 1933
(6) JOHNSON, C. A. AND CARLSON, A. J.: The effect of hunger contractions upon the knee jerk, Am. J. Physiol., 84:189–191, 1928
(7) MCLESTER, J. S.: Nutrition and Diet in Health and Disease. Philadelphia: W. B. Saunders Co., 1931
(8) RENSHAW, S.: Children's Sleep. New York: The Macmillan Co., 1933
(9) WADI, TOMI: An experimental study of hunger in its relation to activity, Arch. Psychol., No. 57, 1922

ORGANIC ACIDS AND THE ACID BASE RELATIONSHIP: OXALIC ACID IN FOODS

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FOODS containing organic acids generally yield alkaline residues in the body. The reason for this is that the organic acid occurs in part as a salt of a basic element which reacts alkaline as the organic acid is oxidized. Excepting such fruits as prunes, plums, cranberries, etc., that give rise to quinic acid (1), the first statement cannot be challenged, but the explanation in the second statement is not always tenable in the light of recent data.

Underhill (2) and associates and Finkle (3) have shown independently that the body has no ability whatsoever to oxidize tartaric acid, and any tartaric acid that is assimilated from the alimentary tract must be eliminated as such. However, a large proportion of ingested tartaric acid is always broken down by microörganisms in the digestive tract. Whether tartaric acid-bearing fruits react acid or alkaline in the body, therefore, depends upon whether the proportion of tartaric acid assimilated exceeds the basic elements supplied by the fruit (4).

Ostberg (5) could find no increased citric acid in the urine in a 24-hour sample after ingestion of 40 grams. It is his opinion that citric acid may play a metabolic rôle analogous but opposite to ammonia and may neutralize excess alkali. Kuyper and Matill (6), however, in half-hour samples after ingestion of 2, 5 or 20 grams, demonstrated increased urinary citrate totaling $1\frac{1}{2}$ per cent of that ingested. The logical conclusion is that while urinary citrate originates from ingested food, citric acid is fairly completely oxidized by the system.

While the above acids have been the subject of scientific study, oxalic acid has too often been the stimulus for sensational news items. Oxalic acid is generally regarded as a toxic or poisonous substance and is so labeled. The writer once purchased some oxalic acid in a small village drug store. As the sparkling crystals were being poured out to be weighed, one was picked up and eaten, whereupon the young lady behind the counter threw up her hands in horror, thinking that suicide was being committed before her very eyes. Her fears were allayed, however, by being assured that the toxicity of oxalic acid, like that of many other substances, is very much dependent upon the quantity eaten.

Ordinary table salt may be toxic. If cattle are given the coarse salt used to freeze ice cream, instead of using it as a lick, they sometimes eat

it in sufficient quantity to cause death. Young chicks are particularly sensitive to salt.

Oxalic acid has been said to be fatal in 2 to 30-gram dosages (7). Generally 10 grams for adults, and 3 to 4 grams for children are regarded as the lethal dose. To secure these amounts, adults would have to eat 5 pounds of a food containing 0.5 per cent of oxalic acid, and children, 1.5 pounds. It has been estimated that approximately 0.6 grams (7) in the human blood stream at one time are equivalent to the calcium present. Calcium combined with oxalic acid is useless to the system and it is thus that oxalic acid exerts its toxicity, the nerve centers suffering in particular by being robbed of calcium.

With animals the toxic effect of oxalic acid has been more definitely studied experimentally by subcutaneous injection, whereby the amount in the blood can be varied at will. The calcium that combines with oxalic acid introduced into the blood is rather promptly replaced by calcium being mobilized from other tissues of the body and the toxic symptoms are thus relieved. While subcutaneously injected oxalic acid all enters the blood, this may be only in a small measure, or not at all true of oxalic acid in the food.

MISAPPREHENSION ABOUT OXALIC ACID IN FOODS

There has been considerable publicity of late about oxalic acid in certain foods. Perhaps spinach has received most mention, although rhubarb was formerly most frequently condemned on this score. From a recent newspaper editorial is taken the following: "'You might just as well eat poison as eat spinach' says a prominent doctor who has just completed a postgraduate course at the Mayo Clinic." Unfortunately not everyone takes such statements, occurring all too frequently, with the proverbial *grain of salt*, which happens to be non-toxic.

The status of our information as to the quantity of oxalic acid in our foodstuffs and its physiological effect is far from satisfactory. Professor Sherman in his last edition of *Chemistry of Food and Nutrition*, states:

> Because of lack of knowledge as to the handling of oxalic acid and oxalates in the body, foods reported as containing these cannot be discussed satisfactorily in this connection. Pineapple and spinach are among the foods so reported.

The connection mentioned in this quotation refers to the ability of certain foods to react alkaline while others react acid in the system. In a recent article in the *Journal of the American Medical Association* (8) en-

titled "Calcium Need and Calcium Utilization", the following sentence occurs: "Oxalic acid (present in leafy vegetables) combines with calcium, forming insoluble calcium oxalate which cannot be absorbed." The point to be conveyed by the context of this sentence is that oxalic acid prevents the most efficient use of the calcium in food.

In the above quotations, pineapple and leafy vegetables, notably spinach, are implicated. As a matter of fact, practically every fruit and vegetable contains oxalic acid in greater or lesser amounts. This is illustrated in the accompanying table (9). The figures can be regarded as only a close approximation to true values. There is great need for a reliable method for the accurate determination of oxalic acid in foods.

CONDITION OF OXALIC ACID IN FOODS TENDS TO RENDER IT HARMLESS

Since oxalic acid is toxic; since it combines with calcium in such a way as to render the calcium useless to the system; since calcium is the element in which, it is said, ordinary diets are most likely to be deficient; and since oxalic acid is so universally present in our foods, it is apparent that a somewhat complicated situation exists. Oxalic acid occurs generally as a salt, either as calcium oxalate or as potassium oxalate. To the extent that the food in which it occurs contains calcium, the oxalic acid occurs as calcium oxalate. If there is an excess of oxalic acid over calcium with which it can combine, it occurs as potassium oxalate or in the free state.

Calcium oxalate is extremely insoluble and it has been shown that it remains so throughout the digestive tract (10). It therefore acts as so much roughage in the diet with no further physiological effect. Potassium oxalate and the free acid are soluble and hence may enter the blood from the digestive tract. However, rhubarb, spinach, and other foods containing them are seldom eaten alone. The calcium in other foods eaten simultaneously will then tend to react with it to convert it into insoluble calcium oxalate, or the calcium will enter the blood stream to replace that removed by oxalic acid. It is thus apparent that the possibility of foods with a high oxalate content having any deleterious effect when eaten is dependent on circumstances.

Rhubarb leaves, cooked and served as spinach, were used to a considerable extent during the war in certain European countries. Sickness among children has been reported as resulting from this practice, and one fatal case is alleged to have occurred.

Some doubt is cast on the reported cases of so-called oxalate poisoning, however. Maue (10) investigated a case in which several people were

reported as sick, due to eating rhubarb leaves "a la spinach." Thereupon he and five other men repeatedly ate rhubarb leaves, cooked like spinach, without the slightest ill effect. As a guarantee against any possible harmful effects, Angerhausen (7) suggested adding to stewed rhubarb calcium carbonate sufficient to combine with the oxalate present. Needless to say, this is not practiced, as it is probably wholly unnecessary.

The almost universal occurrence of oxalic acid in fruits and vegetables brings up the question as to its possible function. It occurs generally in green fruits as calcium oxalate crystals which disappear upon ripening of the fruit. It has therefore been suggested that these calcium oxalate crystals afford mechanical support for the inner epidermis of the cell. It is well known that green fruits are rigid and that this rigidity disappears on ripening. It has also been suggested that calcium oxalate crystals in each cell have a fundamental effect on the illumination of the cell due to their peculiar refractive effect on light rays. By some, oxalic acid in vegetable tissues is regarded as a degradation product. As such it has been said to cause the leaves in certain conifers to fall, the calcium oxalate crystals in the connecting tissue forcing a separation of the old leaves from the tree. It must be admitted, however, that these are merely theories and that the real function of oxalic acid or calcium oxalate crystals occurring in vegetable cells is still a matter of mystery.

It is interesting to trace the reason for pineapple's being given special attention because of its oxalic acid content. It is said that new arrivals on the Hawaiian Islands (11), upon consuming large quantities of raw pineapple, experience a "soreness and burning of the mouth and oesophagus and discomfort in the stomach", and that "a plausible explanation seems to be presented by the calcium oxalate crystals in the juice". However, no determination of the quantity of these present was made.

Raw pineapple contains a proteolytic enzyme. Possibly this is the reason for the popularity of the invalid's dish consisting of a slice of pineapple on a lamb chop. The proteolytic enzyme in raw pineapple tends to digest the lamb chop. Because of this property, raw pineapple cannot be used in making gelatine dishes. Since the mucous lining of the mouth and throat are of protein-like material, the irritating effect from eating raw pineapple seems clearly explained.

While such an effect from the proteolytic enzyme in raw pineapple awaits definite proof, it is evident that pineapples contain no more oxalate than many other common fruits and rank low in calcium oxalate compared with a number of other foods that lack the effect ascribed to raw pineapple. The bulk of this fruit is consumed in the canned form.

Canning cannot affect any calcium oxalate crystals in pineapple, but does inactivate the proteolytic enzyme.

OXALIC ACID A PRODUCT OF DIGESTION

Not only is oxalic acid a normal constituent of practically all vegetables and fruits, but it is a normal product in the animal body. It is normally found in the urine, and originates in part from the food eaten. Some oxalic acid is actually formed in the animal system as a normal product of digestion. It has been shown (12) that oxalic acid may be produced from fats, proteins and carbohydrates in the normal digestive process.

In certain abnormal conditions, oxalic acid is produced in greater quantities than normally appear in the urine. This is particularly true in diabetes and under other conditions in which the kidneys and pancreas are diseased. In such cases, it appears that the oxalic acid is the result of incomplete burning or breaking down of the carbohydrates in the diet. The administration of insulin reduces the amount of oxalic acid in the blood and the urine, just as it reduces the amount of sugar in the blood and urine. It has been shown that insulin effects an increased ability of the system to oxidize or burn oxalic acid, rather than to lessen the tendency to its formation from the digestive processes (13).

Excessive oxalic acid in the urine may be brought about by other causes. Bacteria and fungi in the intestinal tract may produce oxalic acid which may be absorbed and then eliminated in the urine. Tape worms are particularly responsible for causing high oxalic acid excretion in the urine.

Under normal conditions, the blood, liver and muscle tissue are able to oxidize or burn certain amounts of oxalic acid. Under certain abnormal conditions, it appears that more oxalic acid is formed than can be oxidized or burned, and therefore it must be eliminated by the kidneys in the urine.

OXALIC ACID IN A NORMAL DIET IS HARMLESS

While there is still a great deal to be learned about many of the questions involved in the foregoing, there are a few facts that justify our assuming an attitude of indifference to the more than occasional scare raised about certain foods because they happen to contain more oxalic acid than certain other foods. Its universal occurrence makes it certain that we are eating daily more or less oxalic acid in the form that occurs in foods, and there is no indication that, under normal conditions, this results in anything but normal consequences. Oxalic acid eliminated

by the body, whether originating from ingested food or from normal digestive processes, takes with it an equivalent quantity of calcium, but the amount of calcium so lost is normally insignificant. An adequate supply of calcium is more logically assured by proper choice of calcium-bearing foods than by being unduly concerned with the amount of oxalic acid in the diet.

If one deliberately undertakes to eat an abnormal quantity of a food at one time, it is possible to suffer ill effects whether that food contains oxalic acid or not. Since rhubarb is most frequently accused from the standpoint of oxalic acid content, we may recall that rhubarb is said to contain other substances of even more marked physiological effect than oxalic acid. Saponin has been mentioned in this connection, but its effect should not be misinterpreted or detract from our customary use of rhubarb as a food. Many other foods contain physiologically active constituents, and the normal individual who observes moderation and common sense in dietary matters may disregard the question of oxalic acid in foods. Abnormalities are properly referred to the family physician, rather than treated on the basis of haphazard views gleaned from newspapers.

Per cent oxalic acid reported in foods

Apples	0.005
Asparagus	0.009
Beets	0.03 to 0.04
Beet greens	0.62 to 0.75
Brussels sprouts	0.002 to 0.004
Carrots	0.013
Cauliflower	0.006
Celery stalks	0.002 to 0.028
Cherries	0.008
Cocoa	0.45 to 0.49
Coffee (roasted)	0.01 to 0.08
Coffee (beverage)	0.002
Currants	0.03
Dandelion greens	0.0
Endives	0.003 to 0.01
Figs, dried	0.1 to 0.12
Grapes	0.008
Kale	0.0
Kohlrabi	0.007
Lettuce, head	0.003
Melons	0.003
Mustard greens	0.0
Onions	0.005
Oranges	0.01

Pears	0.02
Pepper (ground)	0.32 to 0.46
Pineapple	0.01 to 0.03
Pineapple juice	0.007 to 0.03
Potatoes	0.04
Raspberries	0.05
Rhubarb leaves	0.30 to 1.11
Rhubarb stems	0.25 to 0.29
Sorrel	0.27 to 0.36
Spinach	0.29 to 0.69
Spinach, New Zealand	1.198
Squash, summer	0.003
Strawberries, garden	0.01 to 0.06
Strawberries, wild	0.06
Tea, black	0.37 to 1.43
Tea (beverage)	0.0044
Tomatoes	0.005 to 0.011
Turnip tops	0.0

REFERENCES

(1) KOHMAN, E. F. AND SANBORN, N. H.: J. Ind. and Engin. Chem. 23:126, 1931
(2) UNDERHILL, F. P. AND ASSOCIATES: J. Pharmacol. and Exper. Therap. 43:351–398, 1931
(3) FINKLE, P.: J. Biol. Chem. 100:349, 1933
(4) SAYWELL, L. J.: J. Nutrition 5:103, 1932; 6:263, 1933; 6:397, 1933
PICKENS, L. M. AND HETLER, R. A.: J. Home Econ., 22:44, 1930
(5) OSTBERG, O.: Acta. med. Scandinav. Suppl. 50:172, 1932
(6) KUYPER AND MATTILL: 1933 meeting Am. Soc. Biol. Chem.
(7) ANGERHAUSEN, J.: Z. Nahr. Genussm. 39:81, 1920
SHIRM, A. H. AND WESTER, D. H.: Ber. Deutsch. Pharm. Gesellsch. 28:127, 1918
(8) BERNHEIM, A. R.: J. A. M. A. 100:1001, 1933
(9) ARBENZ, VON E.: Mitt. Lebensm. Hyg. 8:98, 1917
ANGERHAUSEN, J.: Z. Nahr. Genussm. 39:81, 1920
RYDER, A. E.: J. Home Econ. 22:309, 1930
NELSON, E. K. AND MOTTERN, H. H.: J. Am. Chem. Soc. 53:1909, 1931
Also unpublished results from this laboratory.
(10) MAUE, G. AND KIEL: Z. Nahr. Genussm. 40:345, 1920
(11) MILLER, C. D.: J. Home Econ. 20:498, 1928
(12) DE LUCIA, P.: Boll. d. Soc. ital. di biol. sper. 5:473, 1930
(13) DE LUCIA, P.: Boll. d. Soc. ital. di biol. sper. 4:756, 1929

NEWER TRENDS IN NUTRITION[1]

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THREE recent papers have inspired this résumé of the newer trends in nutrition. The theme of this paper, the interrelationships among the different nutritional factors, was spoken of by Dr. Sherman (1) as one of the six aspects of our present day concept of the chemistry of nutrition. Those of you who have read his paper, given at the 1933 meeting of the American Chemical Society, will remember that he pointed out that if, as is now considered, thirty or more chemical entities must be nutritionally supplied to the body from without, "a human lifetime would not be sufficient for the consideration of all possible relationships." No wonder that it is difficult to keep up with the newer trends of nutrition and to decide what to select from among them for comparatively brief discussion.

The other papers referred to are the 1933 presidential address of Sir Frederick Gowland Hopkins (2) before the British Association for the Advancement of Science, and an address by Dr. W. L. Brown (3) before a section of the British Medical Association. As I read these three papers, I realized as never before that we are in an expanding universe as far as knowledge of the principles of nutrition is concerned, a universe in which interrelationships are becoming more and more complex as we become better acquainted with what Hopkins refers to as the chemical aspects of life.

Hopkins used as a single illustration of the remarkable changes in belief which have taken place in the past thirty years, the difference between the theories of muscle activity current in 1895 and at the present time. The earlier concept was that the muscle substance as a whole undergoes a continuous building up and breaking down; the present, that the colloidal muscle structure is rather of the nature of a more or less stable apparatus in which carbohydrate stores (and in some instances fat stores) undergo oxidation, furnishing the energy for muscular work. The various steps in this oxidation process are now known, and there is some information concerning the chemical reactions involved in the mechanical act of muscle contraction.

This sounds more like physiology than nutrition, but the orderly progress of these reactions depends upon proper nutrition, and we are learn-

[1] Presented before the Tri-State Dietetic Association, Atlanta, Georgia, February 17, 1934.

ing that various pathological conditions are simply the result of disordered nutrition through lack of certain essentials, or unfavorable proportions of substances which depend upon one another for their utilization, or some metabolic disturbance which prevents the assimilation and utilization of available materials.

Dr. Harriet Edgeworth's history serves as an excellent illustration of this point. After suffering for several years from that baffling disease of extreme muscular weakness, myasthenia gravis, she (4) discovered that the drug ephedrin, a plant principle similar in some respects to adrenalin, had such remarkably beneficial effects that within a few weeks she had recovered from the paralysis sufficiently to be able to sit up and move about a little. With continued treatment she is now able to lead a comparatively normal life. Some link in a deranged metabolism is being supplied by ephedrin, for whenever she stops the treatment muscular weakness returns very rapidly.

A little later favorable reports from Germany (5, 6) on the beneficial effects of the administration of the simple amino acid glycine to patients with progressive muscular dystrophy led to its trial in this country at the Mayo Clinic (7) and in Germany (8), both alone and combined with ephedrin, in the treatment of myasthenia gravis. Thus far, combined treatment with glycine and ephedrin seems to be more effective than either alone. She feels that the discovery of this relationship between ephedrin and glycine may throw light upon other pathological conditions involving muscle tissue. Metabolic studies at the Mayo Clinic have already shown that the administration of glycine in myasthenia gravis causes considerable change in nitrogen metabolism, pointing to the possibility that glycine may be a substance of much greater importance as a food than has generally been believed. The power of the normal body to synthesize glycine has led to its neglect as a nutritional factor which, under certain circumstances, must be provided from without.

The possibility of such profound changes being wrought by these substances on the muscle tissue is made more plausible by Hopkins' discussion of the importance of molecular structure in determining the properties of living systems, and of the part played by enzymes, which catalyze and speed up specific chemical reactions in the cells; the hormones, which carry chemical messages from organ to organ; and the vitamins, which he associates closely with the hormones and which Brown, in the third paper referred to, calls exogenous hormones. Hopkins goes so far as to state that in animals that apparently do not require a special vitamin in their food supply, as is the case with rats and various other species for

vitamin C, the vitamin that can be shown to be present in various organs is a real or endogenous hormone.

Brown's paper on "How Do Drugs Act?" carries still further the concept of the complexity of the metabolic processes going on within our bodies, by showing how certain drugs can take the place of chemical substances formed within the living cell, or can increase and diminish the action of hormones. Both Hopkins and Brown emphasize the importance of knowledge of chemical structure of hormones, both endogenous and exogenous, before their physiological action can be explained. The rapid development in the past few years in knowledge of the structure of certain hormones and vitamins is one of the most striking contributions to nutrition and illustrates the newest of trends—the effort to understand what lies behind normal and abnormal metabolic changes.

This preamble seemed necessary to show in what direction the science of nutrition is proceeding; a few examples of recent progress in the field of the vitamins and the mineral elements will now be cited.

Vitamin A. The formation of vitamin A in the body of certain species of animals from the yellow plant pigment carotene is now an old story, but with further study the limitations in this synthesis become more apparent. Rea and Drummond (9), finding it impossible to demonstrate the formation of vitamin A from carotene, in cats, have suggested that carnivorous species may not possess the ability to bring about this conversion and that the power is normally part of the mechanics concerned with the assimilation of plant foods. If this is true, omnivorous species like man may be assumed to occupy an intermediate position between the carnivorous and herbivorous species, possessing a somewhat limited capacity to convert carotene into vitamin A. However, in testing this hypothesis still further, Drummond and MacWalter (10) found that, after injecting carotene into the portal circulation of rabbits, no increase in the vitamin A content of the liver could be detected until eight days after the experiment. Uncertainty concerning the extent to which the body can utilize carotene, together with the well-known instability of pure carotene, may account for the reluctance of some of the medical profession to place commercial preparations of carotene on a par with such a natural concentrate of vitamin A as "Haliver" oil as a supplementary source of vitamin A in building up resistance to infection.

This brings us to the disputed question of the anti-infective properties of vitamin A. One of the clearest explanations seen concerning the relationship of vitamin A deficiency to infection is that of Cramer (11) who, commenting on the relationship between the action of hormones and

vitamins, as brought out by Brown, emphasized once again, as he had several years earlier (12), his belief that diseases resulting from a deficient supply of vitamins are not diseases *sui generis*, but similar to endocrine dysfunction—the result of specific pathological changes in certain tissues. If these are maintained long enough they lead automatically to the development of other pathological conditions which do not disappear when the vitamin is supplied. A deficient supply of vitamin A produces, as a primary effect, atrophy of the mucous membranes of the respiratory and digestive tracts and mucous glands, enabling rather avirulent bacteria to infect these tissues, enter the blood stream, and set up metastatic changes elsewhere. In his opinion vitamin A is incapable of freeing the mucous membranes from an infected condition once acquired, but by strengthening the membranes can aid in preventing further infection. It seems to me that failure to recognize this difference has been the cause of loss of faith in the anti-infective powers of vitamin A.

The extraordinary richness of halibut liver oil in vitamin A has raised the question of the source of the vitamin. In a study of this, Lovern and his associates (13, 14) have came to the conclusion that the ultimate source of vitamin A for the halibut, as for other fish, is the carotene in the diatoms which make up the food of the plankton which, in turn, are eaten by the fish, and that it is simply a matter of additive storage of the vitamin in the liver—the older the fish the larger the storage. The wide variations in vitamin A content which have been noted are probably due to the age of the fish and also to periodic drains upon the liver reserves for metabolic processes as yet not fully understood.

All of this has an application in human nutrition, with more or less experimental evidence from liver analyses on autopsy (15, 16, 17, 18). It is quite conceivable that if the diet from early infancy is consistently rich in sources of vitamin A, not only will there be a sufficient provision for growth, but there will be gradually built up in the liver such reserves of this vitamin that adults will not need to resort to vitamin A concentrates during the winter months to maintain resistance against respiratory infections. Thus anything that can be done systematically through life to build up and maintain large stores of vitamin A in the body is worth doing.

A practical illustration of interrelationships, in this case a harmful one, may be mentioned. Several years ago Rowntree (19) demonstrated that mineral oil tended to wash vitamin A out of the system of children, or at least to prevent its complete absorption and utilization. Mitchell (20) recently reported that ten times more than the usual amount of

spinach was required as the sole source of vitamin A to promote growth at a unit rate in rats, when mineral oil in amounts corresponding to the usual human dosage was administered. When the oil was administered six hours later than the spinach, less of the vegetable was required, but even with this lapse of time considerably more was required than when fed alone. Recently Jeans has described the visual purple test (21) by which he was able to detect depletion of vitamin A reserve in some of the children studied in as short a time as six weeks of mineral oil administration in doses no larger than are customarily given.

There are probably other more complicated factors than the dissolving out of vitamin A by mineral oil, which may prevent the utilization and storage of this vitamin. Mellanby (22) has shown that in the absence of vitamin A animals develop lesions in the spinal cord similar to those seen in subacute combined degeneration which often accompanies pernicious anemia, and that these lesions can be cured by vitamin A. Hopkins questions, if the vitamin A deficiency theory is correct, how these lesions can occur in patients who are receiving an ordinarily adequate amount of vitamin A. He suggests that the absence of hydrochloric acid and Castle's (23) intrinsic pernicious anemia factor may prevent the body from utilizing vitamin A, and that the massive doses of iron which are helpful to this phase of pernicious anemia (though not for the maturation of red blood cells) may in some way facilitate the utilization of vitamin A.

Urinary calculi have long been associated with lack of fat-soluble vitamins. Studies by Bliss, Livermore and Prather (24) of the relative incidence of urinary calculi in rats on diets deficient in both vitamin A and D, and in vitamin A alone, led them to conclude that, while vitamin A is of greater importance than vitamin D in the prevention of calculi, vitamin D may be of indirect influence. The failure of all of the animals on diets deficient in one or both of these vitamins to develop calculi indicated that some other influence must also be involved. Stasis resulting from extensive inflammatory reactions, an imbalance in phosphorus metabolism, and infection were suggested as factors involved. "Clinically one can utilize the results of these experiments by feeding patients who have passed or from whom calculi have been removed foods rich in vitamins A and D, for it has been shown that a deficiency of these vitamins causes some metabolic upsets or produces back pressure and stasis that result in stone formation."

Vitamin B. Scientific interest in the question of the relation of vitamin B to appetite is attested by the appearance in the *Proceedings of the Royal Society* of a thirty-page report of a study by Harris and his asso-

ciates at the University of Cambridge (25) of the ability of rats, on diets deficient in vitamin B, to discriminate between diets containing and lacking the vitamin. The investigators concluded that it is not instinct but "the association between the character of the food in question and an experience of the immediate response which it has evoked, which enables the depleted rat to discriminate in favor of the beneficial food." In their opinion the fact that the response to vitamin B following a period of deficiency is so rapid accounts for the appetite-producing property of vitamin B. Commenting upon the human application of these findings, the authors express the opinion that "future work will show that 'experience' as contrasted with 'instinct' to which attention has hitherto been so largely directed, plays an important part in determining human appetite." Referring to Davis' experiments (26) in allowing infants to select their own diet, a practice now being extended to the dietary management of certain wards in the Children's Memorial Hospital of Chicago (27), Harris and his associates comment as follows:

> We believe that the idea underlying this proposal is fallacious, and that choice of diet can no more be left to instinct than can the other activities of maternity and child welfare, where until recently, it was widely held that "nature" or instinct was a sufficiently sure guide. Judging from our experiments, as well as on general common sense grounds, it is hard to see how an infant can be expected to discover the need for a dietary constituent which, although it may be without any immediate obvious effect, may yet, by its continued cumulative action, be absolutely essential for its future well-being.

A clue to a slightly different explanation of the experience effect noted by Harris, following immediately upon the ingestion of vitamin B-rich foods, is suggested in a recent paper. Working on the problem of the pathology of vitamin B deficiency in rats, as affecting the central and peripheral nervous systems, Prickett (28) reported that, contrary to several observations in the literature, vitamin B deficiency produces no characteristic changes in the peripheral nervous system, but does produce very definite changes in the central nervous system, consisting first of disseminated foci of hemorrhage or intense congestion, followed by cellular damage varying in degree with the length of time the animal is left on experiment. It seems of considerable significance that of the areas most consistently affected, several are the centers for the equilibratory control of the muscles (noteworthy in relation to the spastic symptoms of vitamin B deficiency), and another is concerned with the transmission of gustatory impulses from the tongue (which immediately recalls the so-called appetite-promoting properties of vitamin B).

Prickett is of the opinion that these symptoms are not the result of actual structural change in the nerve cells, but simply locate the functional disturbances which produce the symptoms of vitamin B deficiency. That these functional disturbances are associated with disturbed carbohydrate metabolism has been demonstrated fairly satisfactorily, but proof of the nature of the disturbance may have to await the preparation of pure vitamin B in sufficient quantity for experimental work.

One more reference to recent work on vitamin B must be mentioned as illustrating the general theme of the interrelationship of nutritional factors. Inflammation of the tongue (glossitis), with atrophy of the lingual papillae, is frequently observed in pernicious anemia and other pathological conditions. Preliminary work with dogs and rats to determine the influence of vitamins A and B on this condition led Hutter, Middleton and Steenbock (29) to surmise that a deficiency of vitamin B was the responsible factor. Following this clue, vitamin B was administered in large doses, with and without the customary liver therapy, to pernicious anemia patients suffering from atrophy of the tongue. In some instances there was a prompt response in alleviation of the tongue symptoms on high vitamin B intake without specific anemia therapy; in others, no response until the liver therapy had been instituted in addition to the vitamin B; and in others still, no response to vitamin B with and without liver therapy. In spite of these discrepancies, the condition in the tongue was thought to be dependent on a vitamin B deficiency. "Experimentally the condition has been regularly reproduced in rats on a vitamin B deficient ration. Clinically the problem is not as clear cut. Instances of pure vitamin B deficiency will respond to an excess of the lacking substance. If the deficiency is conditioned by factors of impaired absorption and assimilation, the addition of the deficient vitamin to the diet may not be sufficient in itself to overcome the basic fault."

Vitamin G (B_2). What was spoken of as vitamin B in the paper noted above, may have contained both B and G, for diets selected for richness in B will also furnish G, and compressed yeast, which was given in one instance, contains both B and G. A similar condition of the tongue, glossitis, with atrophy of the papillae, is characteristic of the canine disease, blacktongue, which has long been considered similar to, if not identical with human pellagra. In fact the tongue and mouth symptoms are frequently present in pellagra as well as in sprue and pernicious anemia. Is it a case of complex interrelationships or lack of a common factor in all of these conditions? In a study of this question, Rhoads and Miller (30) attempted to produce a chronic recurrent, rather than acute form

of blacktongue in dogs, by feeding a diet low but not completely lacking in vitamin G. Although the incidence of acute fatal disease was high, a number of animals developed a chronic disease characterized by loss in weight, diarrhea, stomatitis with recurring atrophic glossitis, and moderately severe anemia, with changes in the bone marrow similar to those of severe scurvy and pernicious anemia. The response to dietary supplements rich in vitamin G was striking, but there was no improvement following either oral or parenteral administration of a liver extract such as used in pernicious anemia and sprue.

On the other hand, Spies (31) reports rapid improvement in stomatitis and glossitis in human pellagra following the intravenous or intramuscular injection of liver extracts, and suggests that "liver extract be used as a parenteral therapeutic agent whenever a severe pellagrin has difficulty in ingesting or assimilating adequate amounts of a highly nutritious diet." Spies and Grant (32) have likewise reported cures of pellagra-like lesions in rats when "Ventriculin," the commercial preparation of desiccated hog stomach which has proved so effective in pernicious anemia, was administered. In the opinion of Spies (33) the chemical substance which prevents or cures dermatitis of pellagra may not be the same as that affecting the other manifestations.

These illustrations serve to show that pellagra is undoubtedly more than a simple vitamin G deficiency disease, although Sherman has optimistically stated that "the chemistry of nutrition is well on the way toward a solution of the pellagra problem through the working out of the nutritional interrelations between vitamin G and whatever other factors are involved."

Experimental work with vitamin G is not without its difficulties, probably because more than one factor is involved, and the symptoms of deficiency vary, depending upon the proportion of the different factors. Day, in the School of Medicine of the University of Arkansas, has produced in vitamin G-deficient rats a condition that he believes to be the most characteristic and unfailing symptom of vitamin G deficiency which had received but little attention in the literature until his first announcement about two years ago (34). The symptom referred to is cataract, not detectable with the naked eye until after about 10 or 12 weeks on the deficient diet, but discernible much earlier with the aid of the ophthalmoscope (35). Human cataract is more commonly found among old than young people, and the finding of cataract in vitamin G deficiency at once recalls the suggestion made by Sherman a few years ago that some of the symptoms of vitamin G deficiency in rats are those of premature senility.

Dr. Day told me, however, that on histological examination the body tissues and organs of rats dying from vitamin G deficiency are not characteristic of senility. His observations on cataract raise the question of incidence of cataract among pellagrins. In some of the large pellagra hospitals in the South records are now being studied to determine the incidence of cataract.

It seems probable that the incidence of pellagra thus far this year is lower than usual. Is this in spite of or because of the depression? Are the poor getting more adequate diets because they are on relief or are they paying more attention to home gardens? It would be interesting to make some comparative study of the qualitative food consumption, this year and last, of pellagrins who have not, as yet, had a recurrence. This provides another argument for an abundant use of the so-called protective foods, milk and green vegetables, for they are perhaps the most practical sources of vitamin G.

Vitamin C. The rapidity with which knowledge of the behavior of vitamin C in the animal body and its distribution in nature has increased since it was identified with the oxidizing-reducing substance isolated by Szent-Györgyi (36) from adrenal gland and first called a hexuronic acid and later ascorbic acid (37), gives hope that when the other vitamins are isolated with equal certainty and abundance many of the baffling problems connected with their functioning will be solved.

It is not possible, within the limits of this paper, to review much of the literature, even of the past year, on vitamin C. Ascorbic acid is an active oxidizing-reducing agent, and a chemical method for its determination based upon this property has been developed (38, 39). Although the method has certain limitations, it has already proved very useful in studying the distribution of vitamin C in animal tissues and organs. Birch and Dann (40) found that tissues known to be rich in glutathione also have a high ascorbic acid content and suggested that "ascorbic acid (vitamin C) and glutathione may be two linked factors in one system of oxidation in the animal cell," another case of interrelationships. Of particular interest in this connection is Wolbach's (41) study of the sequences in the morphology of intercellular substances in the processes of recovery from scurvy in the guinea pig. He describes the repair of blood clot following injury to the muscles of scorbutic guinea pigs as beginning promptly by migration of fibroblasts from adjacent tissues into the clot. These discharge a liquid which accumulates between the cells. This liquid, which is the precursor of collagen, is homogeneous at first, but later shows the presence of collagen fibrils, the direction and distribution

of which are influenced by what Wolbach calls "fibroglia fibrils." These fibroglia fibrils are described as conductors of agents presumably having reversible enzyme activities. This at least offers a possible clue to the mechanism of the intercellular action of vitamin C.

A recent paper by Bessey and King (39) is of interest in showing the ascorbic acid content in different organs and tissues of various species of animals. In guinea pigs on a vitamin C-rich diet, and in animals presumably not requiring vitamin C in their diet such as rats, rabbits and chickens, there was a fairly consistent relationship in the distribution of the vitamin among the different organs and tissues. The adrenals were consistently high, followed by the brain, liver, ovaries, and testes with relatively high concentration, and then in decreasing order by the heart and kidney, muscle tissue, and blood. Guinea pigs on a vitamin C-free diet, in contrast to the other animals examined, showed a very rapid depletion of vitamin C.

The rapid disappearance of vitamin C from the adrenals of guinea pigs deprived of vitamin C was also pointed out by Siehrs and Miller (42) who concluded that the amount of vitamin C which the guinea pig can store is smaller than generally thought and is rapidly lost either by excretion or metabolism. They are of the opinion that since considerable time elapses between the disappearance of vitamin C from the adrenals and the development of gross symptoms of scurvy, the latter are probably only secondary changes arising as a result of altered metabolism.

Remembering that man resembles the guinea pig in the need for a continuous replenishment of vitamin C, it is safe to conclude that there is a similar wide margin between depletion of body reserves of vitamin C and actual scurvy. It is in this twilight zone that vitamin C deficiency may contribute to various pathological conditions involving tissue metabolism, or perhaps more specifically, capillary resistance. In fact a method of determining capillary resistance is now being used by Dalldorf (43) to detect so-called subclinical scurvy in man, and gives promise of furnishing a similar type of information for vitamin C that Jeans' test does for vitamin A.

Peptic ulcers have been produced by Smith and McConkey (44) in guinea pigs on diets partially deficient in vitamin C, suggesting that this may possibly happen in man, and at least that an ulcer diet should contain an abundance of vitamin C which, alas, has not always been the case. This suggestion would also hold for intestinal tuberculosis, for the same investigators found that a plentiful supply of vitamin C protected the guinea pig against ulcerative intestinal tuberculosis. The claim that

pyorrhea can be prevented or even cured by massive doses of vitamin C has partial justification in the fact that increased capillary resistance in the gums will help to prevent their invasion by pyogenic organisms.

Rinehart and Mettier (45, 46) have presented evidence from experimental work on guinea pigs and from a survey of epidemiological data, suggesting that "latent scurvy prepares the soil or provides the susceptible hosts in whom, with the added insult of acute infection, develop the characteristic train of symptoms and pathological evolution of acute rheumatic fever." The experimental work included studies of the joints and the heart valves and muscles of guinea pigs suffering from either chronic scurvy or infection, or the two combined. Neither the subacute scurvy nor the infection, alone, produced symptoms characteristic of rheumatic fever, but when the two were combined lesions strikingly like those of rheumatic fever were produced. Should this interrelationship, as shown in the guinea pig, be verified for man, rheumatic fever might be placed in the class of food deficiency diseases, early stages of which might be detectable by the capillary resistance test and checked by increased provision of vitamin C.

Vitamin D, Calcium, and Phosphorus. No better illustration of the complexity of interrelationships in nutrition is to be found than that involving vitamin D, the parathyroid hormone, the phosphatase enzyme, and the mineral elements calcium and phosphorus. It is almost impossible to keep up with the voluminous literature in this field. Only one or two of the more recent investigations which have a direct slant upon human nutrition can be cited as illustrative of present trends.

Kozelka, Hart and Bohstedt (47), on the basis of work with dogs, have suggested that the function of the parathyroid glands in normal animals is to maintain a normal serum calcium and phosphorus level in the blood, at the expense of the skeleton, especially toward the end of gestation and during early lactation when the demands for calcium and phosphorus are particularly large. "Their unusual activity in late gestation and early lactation would account for the many negative calcium balances that have been observed in lactating animals, in spite of the ingestion of liberal amounts of vitamin D."

Calcification in the tissues of rats following massive doses of vitamin D was attributed by Ham and Portuondo (48) to the ability of vitamin D to increase the amount or activity of the parathyroid hormone in circulation, which in turn attracts calcium from the various tissues of the body, particularly the bones and intestines. The hypothesis was further tested by Schour and Ham (49) by following the process of calcification

in the growing incisors of rats during the rise and fall of the serum calcium level following the administration of single large doses of either vitamin D or parathyroid hormone. Histological studies of the dentin at varying intervals thereafter showed first a strip of imperfectly calcified and, second, a strip of normally or excessively calcified dentin. The former is thought to represent the area calcified while the serum calcium level was rising and the latter, while it was falling after the hypercalcemia. This stratification was produced by abnormal amounts of what might be called the endogenous and exogenous hormones for calcium. It is not unreasonable to suppose that when calcium or phosphorus metabolism is upset in any way it may be reflected in this condition of the teeth as well as the bones.

Boyd, Drain and Stearns (50) have shown that the concentration of both calcium and phosphorus in the blood serum of children is not correlated with the condition of the teeth, but that there is a definite correlation between the degree of retention of calcium and phosphorus and freedom of the teeth from decay. In the feeding of infants and young children the relative proportions of calcium and phosphorus in the diet are considered by Stearns (51) to be fully as important as the absolute intakes of these elements. The ratio of Ca:P in cow's milk is thought to be a safe guide to follow in the preparation of milk substitutes, such as soy bean milk.

It is largely because of the combination of vitamin D with satisfactory ratios of calcium to phosphorus that vitamin D milk is proving so satisfactory an antirachitic for infants. According to Hess (52), "irradiated milk seems to be the most desirable antirachitic for prevention on a commercial scale. Only 20 to 24 oz. daily is needed to secure protection. This therapeutic agent has the advantage of being automatic and inexpensive and of providing calcium and phosphorus as well as the antirachitic factor." The literature on various means of increasing the vitamin D content of milk is too extensive to note, but in some form or other vitamin D-enriched milk is now being distributed in most of the large cities.

Iron, copper, and the various anemias. The story of the relation of copper to iron in the formation and regeneration of hemoglobin, and thus in the prevention and cure of simple nutritional anemia, is too old to relate. It is now generally conceded that the function of copper is to mobilize the iron from the reserve stores in the liver and thus act as a sort of catalyzer in the formation of hemoglobin. Schultze and Elvehjem (53) have demonstrated, in rats, that copper is as essential a supple-

ment to iron for the production of reticulocytes as for the regeneration of hemoglobin, and go so far as to say that it is very probable, even in pernicious anemia, that the reticulocyte response following liver therapy depends in part upon the presence of sufficient available iron and copper.

The question of the necessity of considering copper as well as iron in diet planning is answered by Elvehjem (54) as follows:

> We may say that diversified diets supply sufficient iron and copper for the maintenance of a normal blood stream in adults with normal hemoglobin requirements. For rapidly growing children and for adults with increased hemoglobin demands, many diets may be low in iron and possibly copper. The value of foods for supplementing diets low in iron and copper must be based upon the amount of available elements, not upon the total content. Diets deficient in blood forming elements may be rendered complete by the addition of standardized quantities of iron and copper salts.

A chemical method for determining the availability of iron from different sources for hemoglobin formation has been checked by Elvehjem, Hart and Sherman (55) against the customary rat feeding tests, with consistent results in most cases. Should the method prove thoroughly reliable, it will be much simpler than at present to determine the potencies of various foods for the prevention and cure of simple nutritional anemia —otherwise known as secondary, hypochromic microcytic anemia.

An entirely different set of relationships is involved in primary, hyperchromic, macrocytic (pernicious) anemia. It was in 1932 that Strauss and Castle (23) advanced the theory that this type of anemia is due to the lack of a specific hemopoietic reaction between an extrinsic factor (which at that time was considered to be vitamin G) and an intrinsic factor which is present in normal gastric juice. It is upon this theory that the use of hog stomach in pernicious anemia therapy is based. Wilkinson and Klein (56) explain the relationship between the active anti-anemic substance in stomach and liver thus:

> Hemopoietin, the stomach active principle (Castle's intrinsic factor) + Unknown constituent of beef or gastric muscle (Castle's extrinsic factor) = Liver active principle

The superiority of hog stomach treatment over oral liver therapy is accounted for by the fact that the stomach preparation contains the labile enzyme (intrinsic factor), the substrate (extrinsic factor) and possibly the end point of their reaction (the stable active principle which under normal conditions is stored in the liver).

The very complexity of the reaction involved in this theory helps to

explain irregularities in the response to treatment of different anemias of the hyperchromic or macrocytic type. The pernicious anemia of pregnancy is usually not of long duration and responds rapidly to treatment. Strauss (57) explains this on the ground that this form of anemia in pregnancy is generally due to the temporary lack in the gastric juice of the intrinsic factor alone, although occasionally the extrinsic factor may be involved. The hypochromic anemia of pregnancy on the other hand is explained as being due "either to a direct dietary deficiency or to a deficiency conditioned by gastric anacidity, hypoacidity, or associated defects in the presence of the fetal demand for blood building." The hypochromic anemia can be relieved completely, either during or after pregnancy, by the administration of iron in rather large doses, and the hyperchromic type ordinarily by liver therapy, although iron is frequently required.

This paper of Strauss, with its classification of the various types of anemia which may occur in pregnancy, and one by Parsons (58) classifying the deficiency anemias of children, will serve as a good stopping point in this far from complete review of recent literature illustrating relationships among nutritional factors. To quote Sherman once more—"a human lifetime would not be sufficient for the consideration of all possible relationships."

REFERENCES

(1) Sherman, H. C.: A century of progress in the chemistry of nutrition, Scient. Mo. 37: 442, 1933

(2) Hopkins, F. G.: Some chemical aspects of life; Science 78: 219, 1933

(3) Brown, W. L.: "How do drugs act?" Brit. M. J. No. 3804, 1007, 1933

(4) Edgeworth, H.: A report of progress in the use of ephedrin in a case of myasthenia gravis, J. A. M. A. 94: 1136, 1930

(5) Thomas, K., Milhorat, A. T., and Technor, F.: Untersuchungen über die Herkunft des Kreatins. Ein Beitrag zur Behandlung progressiver Muskelatrophien mit Glykokol, Ztschr. f. physiol. Chem. 205: 93, 1932

(6) Milhorat, A. T., Technor, F., and Thomas, K.: Significance of creatine in progressive muscular dystrophy and treatment of this disease with glycin, Proc. Soc. Exper. Biol. and Med. 29: 609, 1932

(7) Boothby, W. M.: Myasthenia gravis: A preliminary report on the effect of treatment with glycine. Boothby, W. M., et al.: Myasthenia gravis: Second report on the effect of treatment with glycine, Proc. Staff Meet., Mayo Clin. 7: 557; 737, 1932

(8) Remen, L.: Zur Pathogenese und Therapie der Myasthenia gravis pseudoparalytica, Deut. Ztschr. f. Nervenh. 128: 66, 1932

(9) Rea, J. L., and Drummond, J. C.: On the formation of vitamin A from carotene in the animal organism, Ztschr. f. Vitaminforsch. 1: 177, 1932

(10) Drummond, J. C., and MacWalter, R. J.: The biological relation between carotene and vitamin A, Biochem. J. 27: 1342, 1933

(11) CRAMER, W.: How do vitamins act? Brit. M. J. No. 3806: 1141, 1933
(12) CRAMER, W.: Vitamins and the borderland between health and disease, Lancet 1: 633, 1924
(13) LOVERN, J. A., EDISBURY, J. R., AND MORTON, R. A.: Variations in vitamin A content of fish-liver oils, with particular reference to seasonal fluctuations in the potency of halibut-liver oil, Biochem. J. 27: 1461, 1933
(14) LOVERN, J. A., AND SHARP, J. C.: The diet of the halibut and intensity of feeding in relation to the vitamin A potency of the liver oil, Biochem. J. 27: 1470, 1933
(15) WOLFF, L. K.: The quantity of vitamin A present in the human liver, Lancet 2: 617, 1932
(16) MOORE, T.: Vitamin A reserves of the human liver in health and disease, with special reference to the scope of vitamin A as an anti-infective agent, Lancet 2: 669, 1932
(17) GREEN, H. N.: Vitamin-A content of the liver in puerperal sepsis, Lancet 2: 723, 1932
(18) FOX, F. W.: A study of the reserves of vitamin A in the livers of native mine labourers, with special reference to their resistance to pneumonia, Lancet 1: 953, 1933
(19) ROWNTREE, J. I.: The effect of the use of mineral oil upon the absorption of vitamin A, J. Nutrition 3: 345, 1931
(20) MITCHELL, H. S.: Influence of mineral oil on assimilation of vitamin A from spinach, Proc. Soc. Exper. Biol. and Med. 31: 231, 1933
(21) JEANS, P. C.: Method for determining vitamin A deficiency, J. A. M. A. 102: 892, 1934. Also personal communication.
(22) MELLANBY, E.: The fat-solubles: vitamin their significance in nutrition, Edinburgh M. J. n. ser. 40: 197, 1933
(23) STRAUSS, M. B., AND CASTLE, W. B.: The extrinsic (deficiency) factor in pernicious and related anemias, Lancet 2: 111, 1932
(24) BLISS, A. R., JR., LIVERMORE, G. R., AND PRATHER, E. O., JR.: The relation of vitamin A and vitamin D to urinary calculus formation, J. Urol. 30: 639, 1933
(25) HARRIS, L. J. ET AL.: Appetite and choice of diet. The ability of the vitamin B-deficient rat to discriminate between diets containing and lacking the vitamin, Proc. Roy. Soc., London, Ser. B, 113: 161, 1933
(26) DAVIS, C. M.: Self selection of diet by newly weaned infants: An experimental study, Am. J. Dis. Child. 36: 651, 1928
(27) DAVIS, C. M.: A practical application of some lessons of the self-selection of diet study to the feeding of children in hospitals, Am. J. Dis. Child. 46: 743, 1933
(28) PRICKETT, C. O.: The effect of a deficiency of vitamin B upon the central and peripheral nervous systems of the rat, Am. J. Physiol. 107: 459, 1934
(29) HUTTER, A. M., MIDDLETON, W. S., AND STEENBOCK, H.: Vitamin B deficiency and the atrophic tongue, J. A. M. A. 101: 1305, 1933
(30) RHOADS, C. P., AND MILLER, D. K.: The production in dogs of chronic blacktongue with anemia, J. Exper. Med. 58: 585, 1933
(31) SPIES, T. D.: Treatment of pellagra by means of parenteral liver extract, Proc. Soc. Exper. Biol. and Med. 31: 363, 1933
(32) SPIES, T. D., AND GRANT, J.: An experimental study of a so-called "pellagra-producing" diet, Am. J. Physiol. 104: 18, 1933
(33) SPIES, T. D.: Pellagra: An experimental study of the skin lesions, Proc. Soc. Exper. Biol. and Med. 30: 1227, 1933
(34) DAY, P. L., LANGSTON, W. C., AND O'BRIEN, C. S.: Cataract and other ocular changes in vitamin G deficiency, Am. J. Ophth. 14: 1005, 1931
(35) DAY, P. L., AND LANGSTON, W. C.: Further experiments with cataract in albino rats resulting from the withdrawal of vitamin G (B_2) from the diet, J. Nutrition 7. 97, 1934

(36) SZENT-GYÖRGYI, A.: Observations on the function of peroxidase systems and the chemistry of the adrenal cortex. Description of a new carbohydrate derivative, Biochem. J. 22: 1387, 1928

(37) SZENT-GYÖRGYI, A., AND HAWORTH, W. N.: "Hexuronic acid" (ascorbic acid) as the antiscorbutic factor, Nature 131: 24, 1933

(38) BIRCH, T. W., HARRIS, L. J., AND RAY, S. N.: Hexuronic (ascorbic) acid as the antiscorbutic factor, and its chemical determination, Nature 131: 273, 1933

(39) BESSEY, O. A., AND KING, C. G.: The distribution of vitamin C in plant and animal tissues, and its determination, J. Biol. Chem. 103: 687, 1933

(40) BIRCH, T. W., AND DANN, W. J.: Estimation and distribution of ascorbic acid (vitamin C) and glutathione in animal tissues, Nature 131: 469, 1933

(41) WOLBACH, S. B.: Controlled formation of collagen and reticulum: A study of the source of intercellular substance in recovery from experimental scorbutus, Am. J. Path. 9: Sup. 689, 1933

(42) SIEHRS, A. E., AND MILLER, C. O.: Disappearance of vitamin C from adrenals of guinea pigs having scurvy, Proc. Soc. Exper. Biol. and Med. 30: 696, 1933

(43) DALLDORF, G.: A sensitive test for subclinical scurvy in man, Am. J. Dis. Child. 46: 794, 1933

(44) SMITH, D. T., AND MCCONKEY, M.: Peptic ulcers (gastric, pyloric, and duodenal). Occurrence in guinea-pigs fed on a diet deficient in vitamin C, Arch. Int. Med. 51: 413, 1933

(45) RINEHART, J. F., AND METTIER, S. R.: The heart valves and muscle in experimental scurvy with superimposed infection, with notes on the similarity of the lesions to those of rheumatic fever, Am. J. Path. 10: 61, 1934

(46) RINEHART, J. F., CONNOR, C. L., AND METTIER, S. R.: Further observations on pathologic similarities between experimental scurvy combined with infection, and rheumatic fever, J. Exper. Med. 59: 97, 1934

(47) KOZELKA, F. L., HART, E. B., AND BOHSTEDT, G.: Growth, reproduction, and lactation in the absence of the parathyroid glands, J. Biol. Chem. 100: 715, 1933

(48) HAM, A. W., AND PORTUONDO, B. C.: Relation of serum calcium to pathologic calcifications of hypervitaminosis D, Arch. Path. 16: 1, 1933

(49) SCHOUR, I., AND HORN, A. W.: Action of vitamin D and of the parathyroid hormone on the calcium metabolism as interpreted by studying the effect of single doses on the calcification of dentin, Arch. Path. 17: 22, 1934

(50) BOYD, J. D., DRAIN, C. L., AND STEARNS, G.: Metabolic studies of children with dental caries, J. Biol. Chem. 103: 327, 1933

(51) STEARNS, G.: Soy bean flour in infant feeding: A study of the relation of the comparative intakes of nitrogen, calcium, and phosphorus on the excretion and retention of these elements by infants, Am. J. Dis. Child. 46: 7, 1933

(52) HESS, A. F., AND LEWIS, J. M.: An appraisal of antirachitics in terms of rat and clinical units, J. A. M. A. 101: 181, 1933

(53) SCHULTZE, M. O., AND ELVEHJEM, C. A.: The relation of iron and copper to the reticulocyte response in anemic rats, J. Biol. Chem. 102: 357, 1933

(54) ELVEHJEM, C. A.: Significance of copper and iron in blood restoration, Am. J. Pub. Health 23: 1285, 1933

(55) ELVEHJEM, C. A., HART, E. B., AND SHERMAN, W. C.: The availability of iron from different sources for hemoglobin formation, J. Biol. Chem. 103: 61, 1933

(56) WILKINSON, J. F., AND KLEIN, L.: The relationship between the anti-anaemic principles in stomach and liver, Lancet 2: 629, 1933

(57) STRAUSS, M. B.: The etiology and treatment of anemia in pregnancy, J. A. M. A. 102: 281, 1934

(58) PARSONS, L. G.: The deficiency anaemias of childhood, Brit. M. J., No. 3706: 631, 1933

PERSONNEL PROCEDURE WITHIN THE DIETARY DEPARTMENT

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THE study of foods as a science and the present day conception of human relationships in business and industry are modern developments as viewed from the standpoint of the life span of our organized society, and the art, or profession, of personnel administration is almost ultra modern.

EVOLUTION OF PERSONNEL

Only within thirty-five years or so have working forces grown beyond the stage wherein the owners or managers could know about most of the individuals in their employ. During the late nineteenth and early twentieth centuries, however, this did happen, and Bill, the veteran worker, in many instances, became time clock number 826, and he and his fellows became a commodity to be bought and sold at current rates. The turmoil, bitterness and waste of this period are matters of history.

Some thought was given to the worker as an individual human being just prior to the War. Certain managers conceived the idea that it was not only the decent thing to do, but that it might be good business to have not merely one worker representing so many pounds of bone and muscle with a modicum of skill, but an employee who would put some heart into his job.

Wartime labor shortages led to most elaborate programs designed to secure loyalty, create contentment, and develop enthusiasm for the institution. There were bands, orchestras, athletics, club houses, company stores, employee representation schemes, together with staff executives and departments to look after the "welfare" program. In due time, however, the reaction set in. The worker desired the cost of all that, divided pro-rata, in his pay envelope.

So at the present time, we have a more moderate and workable concept of human relations in industry. We consider the worker neither as a commodity nor a machine, nor as a delicate person whose body and soul should be given incubator care, but as one who reacts to things in general much as we ourselves do.

DEFINITION OF PERSONNEL MANAGEMENT

"Management", says the new *Standard Dictionary*, is "The skillful and prudent use of a means to accomplish a purpose"; it is "the act, art, or manner of managing or carrying on, directing, creating or conducting".

"Personnel" is defined as "the force of persons collectively employed in some service". Personnel has another significant meaning, "the collective characteristics of a group of people employed".

We might condense these definitions into the following: "Personnel management is the skillful directing of the employees and the molding of their morale".

Even with this definition, the term personnel management has a vague sound. It brings to mind thoughts of the psychology of leadership, the art of developing latent talent in individuals, the wage payment systems, foreman training, pension systems, extra curricular morale building activities, and the like. These are indeed worthy and interesting subjects for those needing a detailed knowledge of such things, but it is probable that management of the working force will be only one phase of the dietitian's general administrative problem, and the personnel portion of it will be without too extensive ramifications.

Fortunately, individual experiences in human relationships in the home, at school, in social life and at work provide a background for an understanding of the fundamentals of personnel. Just as one's ordinary experiences seem reasonably clear and understandable, so will the fundamentals of a practical workable personnel program. But there are quite a number of human traits and a variety of human capabilities, and in order to mold a working force into an efficient production unit, smooth in operation, with reserve power for emergencies, many things must be kept in mind. It should be helpful to "bundle up" the elements of a personnel program in compact form for consideration and reference.

PERSONNEL AND THE DEPARTMENTAL BUDGET

Due to the high ratio of payroll to food and other costs, the "dollar angle" of personnel is an important item indeed. In one well-known hospital a saving of 10 per cent on the dietetic department annual payroll, during a recent year, equalled a 5 per cent saving on the cost of foods purchased, and 20 per cent of the year's bill for medical and surgical supplies. Such economies would be very acceptable to most of us in lieu of a year's salary.

The buyers of food and supplies know that these can be brought in

and placed on the shelf, and within certain limits will be known quantities and will "stay put". The buyer of human services, on the other hand, finds that his purchases possess means of locomotion, that they can walk out, slow down, get sick, out of sorts, lazy and careless, and being less precisely labeled, can be placed "on the wrong shelf", or in the wrong department. The handling of personnel is accordingly a challenge to the skill of management and the stakes are sufficiently high to make the game interesting.

Even with our highly developed modern equipment, we must have man power, hand work, and human supervision. Two points, therefore, should be kept in mind: (1) smooth functioning of the various operations is the main objective; and (2) labor turnover is expensive.

JOB ANALYSIS AND JOB SEQUENCE

No matter how small or how large the working force, the staff member responsible for maintaining it will want, first, an occupational description of each job, a condensed picture of the occupation in *terms or factors which affect the worker*. Note the requirements: is a tall or short person needed; does the job require sitting, standing, reaching, lifting, quickness, strength, ability to stand heat or cold or to follow written instructions; is the work repetitive or does it embody a series of new problems or situations? The need for this information is self-evident.

The next step is an organization of the department work so that there will be a logical sequence of jobs. This grouping may be an arrangement of jobs functionally, *i.e.* (1) dishwasher, (2) cart boy, (3) cook's helper, and so on up as far as that class of work logically goes, or it may be in the ascending order of pay. The upward steps may be confined to one department or they may extend throughout the institution.

Why bother? Because it enables employees to take the next job ahead in an emergency; it is an incentive to the employee to learn the job ahead with its higher pay; and it helps solve the "request for a raise" problem, met with so frequently prior to 1929 and which may be with us again shortly. There can be an understanding with the employee that his job pays so much, maximum, and that higher wages will come only when the next job ahead is vacant, which will be his if he has shown ability to handle it.

REQUIREMENTS FOR ECONOMIC SATISFACTION

This lining up of jobs seems to be primarily an aid to and a protection for the professional staff, and it is. There are reasons more basic, how-

ever. Most of us have two fundamental feelings so far as our economic life is concerned. First we want a feeling of security. Fortunately institutions and food purveying establishments generally can offer a continuity of work and security of employment greatly in excess of that afforded by many factories, offices and other businesses. Second, we want to feel that we are successful according to our individual natures and abilities. We like to feel that we are filling a definite place, that we are an essential part of the organization. As one well-known authority on industrial relations expresses it, "Men strive to draw away from the zero of human nonentity". The orderly promotion through well-organized jobs makes it possible for individuals to find their level, thereby satisfying the requirement for permanent economic satisfaction.

PROPER SELECTION OF EMPLOYEES

Experienced personnel managers have found it wise to choose the proper type of person for the job or series of jobs. Too high a type will probably make a dissatisfied and restless employee; on the other hand too limited qualifications will make difficult the emergency promotions sometimes necessary, and will defeat the plan for natural advancement. It is likewise well to be careful about hiring too many persons from the same family, neighborhood, group of friends, religion or race. There are exceptions to this rule; often a trustworthy, forceful veteran employee can be made responsible for the satisfactory performance of relatives, neighbors, or friends that he recommends. Experience indicates, however, that this is an important point to be kept in mind lest the stage be set for a departmental flare-up.

INTERVIEWING THE APPLICANT

Interviewing prospective employees is something like public speaking, or playing bridge. One must be doing these things rather constantly to keep that feeling of ease and assurance. The professional member of the staff who talks to applicants only occasionally may find himself embarrassed and nervous as does the applicant. In the interview, information is being sought which will be the basis for deciding whether or not to offer the job; and so if the interview is to achieve its purpose the tension must be broken.

One artifice is to find some individual, institution, neighborhood, section or town known to both. A reasonable length of time for the interview is essential. Information of value will be gained as the tension lessens, especially during the closing moments of the talk.

THE EMPLOYEE'S RECORD

It is convenient, as a rule, to use an application form, card or record, since it makes the personal questions less offensive. This application form may be used for the employee's permanent record. It should provide space for name, address, age, marital condition, dependents, leisure time activities, whom to notify, telephone, previous employers, educational information, and space for institutional record, such as date hired, rate of pay, department, job, clock number, transfers, pay changes, and comments. These employee record forms usually take on a rather formidable appearance, with dozens of lines, spaces, check marks and symbols. Should the addition of another detailed form to the present overabundance be resented by the busy dietitian, just remember that this record will serve its purpose as a useful reference.

During the interview, and later on, try to learn something of the applicant's recreational and social activities—his background. This point may seem far-fetched, but when it comes time to consider that employee for promotion, the executive will want to know all about that person. From the manager's standpoint, promotions are, at best, decisions surrounded with intangible influences; it is doubly useful to have all the facts at hand.

JUDGMENT VERSUS PREFERENCE IN SELECTION

So much hiring is done by intuition that those connected with organizations supplying applicants have noticed certain phenomena of choice and selection with combined wonder and amusement. A teacher placing graduates of a technical high school discovered that a well-known foundry was partial to boys with triangular faces, that is, well-developed foreheads and pointed chins. A certain laboratory took only the most unprepossessing youngsters. It was useless to send a well-dressed good looking lad. The management of a large textile mill was compelled to move rapidly in staffing a new department. Because this type of work had not been done previously in that city, the employment office made the first selection and sent to the operating manager, who knew the process, for final interview the girls and women thought to possess the ability to learn the intricate operations. The personnel director found that the girls approved were rather uniformly blond, and gifted in the manner of lively repartee. How the personnel man prevailed upon the manager to accept a reasonable proportion of brunettes, less loquacious, but equally nimble-fingered, is not part of this story, but it serves to em-

phasize that we are in business and not in the theatrical world and that the job specification data, plus brains, analysis and judgment, will insure a better body of employees in an exacting production department, than will personal preferences alone.

MEDICAL EXAMINATIONS

Since many city ordinances and possibly state laws prohibit the employment of persons with communicable diseases in food preparation establishments, and since injuries to employees are a direct and indirect expense to the employer, many firms insist on physical examinations of new employees. These examinations should not be unduly exhaustive or expensive, but should be sufficient to detect bodily weakness and deficiencies in hearing, vision, and the like. Very seldom will it be found that an applicant is absolutely unemployable, but rather frequently conditions will indicate that the individual should not be assigned to certain jobs.

INTRODUCTION TO THE JOB

We have said that labor turnover is expensive. The cost of breaking in a new employee in industry has been variously estimated at from ten to fifty dollars. Records show that most labor turnover occurs among new employees. It follows therefore that it is both fair and profitable to shorten and soften that period during which the newcomer feels strange, embarrassed and fearful, by affording him a proper introduction to the job.

The hiring agreement made and the record card filled out, it is then logical to give some instruction regarding the institution as a whole and the general rules and regulations affecting all employees. Quite frequently printed material or an employee's handbook is available for future study and reference. Many personnel managers see that the new employee is taken by a responsible staff member to the department where he will work, and there introduced to the supervisor or department head so that the circumstances are clearly defined, and the new employee may know the direct line of responsibility and supervision which concerns him. The introduction to the job often involves not only personal introduction to supervisors and those who work near by, and an explanation of duties, but the relation of those duties to other work; whom to call in case of interruption of work; standards of dress and conduct; rank of, and correct way to address, those with whom the newcomer will have dealings. Some organizations assign a trusted employee as sponsor

during the breaking-in period. Others designate someone to whom the new-comer can go to ask questions and talk things over. Bear in mind that the introduction to the job should be first "informational" and second "inspirational". After a few days or weeks, it is well to have a talk with the employee to get his impressions of his work to date. A previous talk with the department head will enable the executive to point out ways in which the worker may improve himself.

FOREMAN TRAINING

Now that we have our new employee hired, recorded, and introduced to the job, we must think of the person who will have him directly in charge.

All through the literature on management runs the phrase "foreman training". The foreman or his equivalent, being the immediate supervisor of the worker, can make or break almost any management plan or program by his attitude. Just a gesture or an expression can upset the most carefully laid plans. The foreman or supervisor is a real factor in personnel as in other phases of management. Individual judgment in each case will indicate methods best suited to obtain coöperation.

MORALE AND DISCIPLINE

Next we come to the ever present and continuing problem of building morale and maintaining discipline, which is just as much a responsibility of the administrative dietitian as are menus, per capita costs, and quantity cookery. For a quick concept of morale just think of the opposite, demoralize, and what it implies. Morale, then, is a positive term, hard to define, that represents a state of mind in the individual and the group in which are found the qualities of determination, loyalty, coöperation, and solidarity of purpose to carry on in the common cause. Discipline, on the other hand, brings up thoughts of spankings, staying after school, sitting in the corner, going to bed without supper, kitchen police duty, and so forth, according to personal experience.

One writer on management wisely points out that discipline is also a positive term. Its function is to bring up to and maintain the proper standard of conduct and performance of the individual and the group.

ELEMENTS OF LEADERSHIP

We have all been impressed by organizations in which all employees seem absorbed in their work, so intent upon their tasks that a visitor receives but a casual glance. Contrasted with this, in other groups work

seems to stop at the slightest pretext and is resumed slowly. In the first instance we would in all probability find that the personality of a natural born leader had filtered down and permeated the organization. We would find that this leader had a strong, confidence-inspiring personality; that he led because of himself and not because of his executive title: he would have a poised, evenly balanced manner, a reasonable cheerfulness and optimism, tact to apply the right methods at the right time to the right individual or group, courtesy—the innate kind based on good breeding and genuine kindliness—, a balanced sense of justice which gives every worker his due and avoids playing favorites, and lastly the ability to express himself in a straightforward, clear, and positive manner. You will note that we have called this person a leader, not a driver. Application of the Prussian military system of leadership may prevent a few personal misdemeanors, but in our business world today it will tend to produce a colorless, cowed working force lacking in initiative.

What if we do *not* happen to be one of that class of gifted persons who take their places at the head of things so easily? Why not study the elements of leadership, outlined above, more closely, and apply a little self-analysis? There will be some qualities already there to use as a "best foot forward". Many a manager gets along because his men say of him, "He is hard-boiled, but he is square".

Then, too, perhaps some other points can be polished up, for example, stumbling diction, or a diffident manner. Perhaps with a little more planning, a leadership system can be built, a step at a time, with subordinates of proper personality, coached in personnel principles and having immediate supervision over the workers. Perhaps, as a part of this, there can be established a body of customs, plus a few rules and regulations for all to follow. Most of us will adapt our conduct or speed of work to the standard, if all others are doing the same.

When such a system has been created, it follows that problems of individual discipline are infinitely easier. The staff member who must handle the matter becomes spokesman for the system and will not be, in the eyes of the transgressor, merely another individual with a grudge.

TWO GOLDEN RULES OF PERSONNEL

While thinking of what constitutes esprit de corps, we may take the following principles as a background and basis for action in many matters of personnel administration.

These are (1) pay the employee as much as conditions permit, insisting on reasonably hard work for the standard number of hours at the agreed

duties, and (2) consider his personal affairs his own and permit him to conduct them as he will except as they affect his usefulness to the institution. Should circumstances require, have a clear understanding, in advance, as to off duty conduct.

WAGES IN RELATION TO THE PERSONNEL PROGRAM

Rumors of dissatisfaction will naturally focus on wages to a considerable extent. Wages are, in the last analysis, what the employees are there for. Much has been written on the subject of wages, most of which concerns itself with methods of payment that carry incentives for greater production. The simple fundamental fact to be borne in mind is that the wage is a product of supply and demand. If there are plenty of people ready to take your most highly skilled or arduous job, you won't have to pay much to fill it. And, of course, the contrary holds true. As a practical matter the basis for wage payment will be the prevailing rate for the community. The bargaining points will be continuity of work (if it is there to offer), reasonable hours, good working conditions, that is, light, ventilation, personal facilities and tactful supervision. An experienced employment manager once said: "Give me steady production, the working conditions that I want, and 10 per cent less than the going wage scale, and I will develop the best body of employees in the city". If these favorable factors are present they can be used either to keep the average wage at a moderate level or to develop a superlative working force. When the talk around the community runs like this: "I wish I could get in at the B—Company. I hear it is a good place to work", that institution has an asset of great value.

It may be worth reminding managers that much can be done to give an organization this reputation even without the expenditure of money. Working conditions, supervision, relations of employer with employees, opportunity and so forth, exercise a tremendous influence on personal efficiency and consequently on group production.

SQUARE PEGS AND ROUND HOLES

Most supervising dietitians will doubtless be in such close contact with department heads that they will know in advance of employees scheduled for discharge, or who threaten to quit because of dissatisfactions. Since it is expensive to break in someone for even the humblest job, it is worth while to give careful thought to a possible transfer in an effort to salvage the employee.

It need cause no chagrin to find that a worker has been wrongly placed.

A wise and successful personnel director likens a job to a Yale lock, and the worker to its key. To operate the lock not only must the right key blank be chosen but it must be filed so that the notches will fit the tumblers in the lock. We can visualize the variables in the key easily enough and we must keep in mind the variables in our people. We know that individuals differ in motive and interest, in special abilities and personal aptitudes. Time slips by and we discover that certain workers have developed, steadied or changed materially in their interests and viewpoints from their condition at the time of hiring six months, a year, or two years ago. Experience has shown that individuals respond differently to different stimuli. Some merit a free rein and others require a close check.

Many times the employee in disfavor should go without delay. Again, a change of job, another supervisor, or a different department, will solve the difficulty. If so, one to several days' wages have been saved which would be paid to a newcomer just to learn the ropes. The "transfer" idea was carried to great lengths during the war, and subsequently when labor was in demand, but even now perhaps one or two transfers are justified except in extreme cases.

THE EXIT INTERVIEW

As employees leave for one reason or another an important thing often overlooked, outside of regularly established personnel offices, is the exit interview and a record of the facts. Even though it may not be possible to get the unbiased details of the case from the outgoing employee, nevertheless by comparing the employee's story with that of the department head, one can determine whether or not the employee is worth rehiring or calling in an emergency. Occasionally these exit interviews give a clue to conditions within the organization that need attention yet are not easily visible.

TURNOVER RECORDS

In connection with the exit interview a "turnover record" should be maintained. On one side of a sheet of paper, write the names or number of the departments. As people leave, mark on that sheet, opposite the department, the clock number or initials of the person and some simple symbol, such as "Q" for quit, "F" for fired, and "L" for laid off. Every three, six or twelve months, look over the form, and where there are more than a few marks and symbols make an analysis from the record cards of these former employees. See if there is not some underlying cause for

that turnover. If it is found necessary to start a new sheet, because the first one is full, better make the analysis then and there. If in a department normally requiring eight people it appears that in a few months sixteen people have been hired to keep it filled, keep the matter a dark secret, at least until the answer has been found. Then the data can be used as exhibit A to your superiors.

OUTSIDE CONTACTS

Now that we have hired our worker, introduced him to the job, disciplined, transferred, discharged him, and made due note of the facts, it is time to go visiting.

The wise manager will cultivate the acquaintance of similar executives in other establishments employing the same kind of help. In so doing information can be kept up to date on current wage rates, and the supply of help available. References on applicants can be checked and help secured in emergencies.

The by-products of friendly acquaintance between executives in similar work in a community are at times extremely interesting. In a large middle western industrial city employment managers met in various groups in a business and social way. Without conscious promotion or adoption of formal resolutions a system of coöperation developed which replaced a condition of suspicion, distrust, and reserve. Wage rates were compared. References on workers were verified. An employment manager with a rush requisition on his desk, could by a few telephone calls have lookouts posted throughout the length and breadth of the city. In busy times workers in demand from out of the city need make but a few calls before being directed to the plants needing them. This service, valuable to employer and worker alike, literally grew out of luncheon table conversation.

While calling on other employers, note the calibre of their people. Should it be evident that one's own force suffers by comparison, perhaps it is because school authorities, employment offices, and others who have occasion to advise persons seeking work, are merely without positive information on the opportunities in that organization. It is just as important to develop and keep in touch with sources of good applicants as it is to keep a check on the sources of supplies for food or equipment.

REFERENCES

WALTERS, J. E.: Applied Personnel Administration. New York: John Wiley & Sons, 1931.

TEAD, ORDWAY AND METCALF: Personnel Administration, 3d ed. New York: McGraw, Hill, 1933.

SCOTT, W. D., CLOTHIER, R. C., AND MATHEWSON, S. B.: Personnel Management. New York: McGraw, Hill, 1931.

CRAIG, D. R., AND CHARTERS, W. W.: Personnel Leadership in Industry. New York: McGraw, Hill, 1925.

SCHELL, E. H.: The Technique of Executive Control. New York: McGraw, Hill, 1930.

BINGHAM, W. VAN D., AND MOORE, B. V.: How to Interview. New York: Harper, 1930.

The Personnel Journal (bi-monthly), Baltimore: The Williams & Wilkins Company.

Personnel (quarterly), New York: The American Management Association.

VITAMIN STUDIES ON APPLES

I. The Vitamins A, B and C Content of the Rome Beauty, Delicious, Stayman, Yellow Newtown and Winesap[1]

IRA A. MANVILLE, AVOCA S. McMINIS and FRITZI G. CHUINARD

NEW developments in any field of research frequently make necessary a repetition of much of the work that has gone before. The acquisition of new points of view as well as refinements in technic add further incentives to re-investigation. The demonstration that the vitamin potency of a given fruit varies with the variety, makes it incorrect to assume that the vitamin potency of a fruit, a vegetable or a cereal, remains constant regardless of the variety tested. Such considerations made it seem advisable to determine the amounts of vitamins A, B and C in several varieties of apples.

Previous work on the vitamin potency of apples has been carefully reviewed. For purposes of brevity, however, the material will not be presented in detail. The accompanying table (table 1) summarizes the data and gives the corresponding references.

SOURCE AND HANDLING OF APPLES

Five varieties of apples were fed as sources of vitamins A and undifferentiated B and C. The 5 varieties were as follows: Winesap, Stayman Winesap, Delicious, Yellow Newtown and Rome Beauty. The apples were raised in the orchards of the Wenatchee and Yakima (Washington) districts on irrigated soil which is largely decomposed lava, rich in minerals. The Rome Beauty and the Delicious were picked in mid-October while the other three varieties were picked late in October. After washing they were packed in oiled paper and placed in cold storage where they were held at a core temperature of 30°F. A quantity of apples sufficient for a 10-day period of feeding was drawn out of cold storage at appropriate intervals and kept in an electric ice-box in the laboratory. Every day, including Sunday, a fresh apple was removed from the ice-box, peeled carefully, and graded amounts cut from a radial sector were added to the diet. In the case of the animals receiving the apple as the only source of vitamins A and B, the fruit was rapidly crushed and mixed with the diet. When necessary enough water was added to make a thick paste. With the guinea pigs used for the vitamin C test, the various amounts of apple were weighed out and fed as one piece, either by

[1] From the Department of Physiology, University of Oregon Medical School, Portland, Oregon. Received for publication Jan. 16, 1934.

TABLE 1

VARIETY OF APPLE	VITAMIN A	VITAMIN B	VITAMIN C	AUTHORITY
Raw apple			1	(1)
Apple juice (1–4 gms. concentrated; equivalent to 7.5–30 gms. apple)			1–4	(2)
Raw apple			3	(4)
Apple peel			3.3	(4)
Raw apple			2–4	(21)
Raw apple		B-12		(17)
		G- 9		(17)
Raw apple		G- 6		(18)
Raw apple	15			(19)
Albemarle Pippin			4 (less than)	(5)
Baldwin			5–7.5	(14)
			1.5	(8, 10)
Belle de Boskoop			6–10	(8, 10)
Bellefleur of Brabant			1.5	(6)
Blenheim Orange			1.5–3.0	(8, 10)
Bramley Seedling			6–10	(8, 10)
Cleopatra			1.5	(8, 10)
Cox's Orange Pippin			1.5	(8, 10)
Dabinett			3.0	(8, 10)
Delicious	24	3.0	3.0	Present paper
Gennet Moyle			3–6	(8, 10)
Golden Delicious	30			(20)
Gravenstein			1.5	(8, 10)
Jonathan	7		1.2–1.5	(8, 13)
King Edward VII			1.5	(8, 10)
Kings			1.5–3.0	(8, 10)
Lane's Prince Albert			3.0	(8, 10)
McIntosh	33			(20)
			1.0	(14)
Newtown Wonder			3.0	(8, 10)
Reinette du Canada			3.0	(8, 10)
Ribston Pippin			1.5–3.0	(8, 10)
Rome Beauty	12	5.0	3.0	Present paper
Starking	16			(20)
Stayman Winesap	17	2.0	2.0–2.5	Present paper
			1.5	(5)
Strawberry Pearmain			1.5	(8, 10)
Warner's King			1.5–3.0	(8, 10)
Winesap	26	2.0	3.0	Present paper
			3.0	(12)
Woodbine			1.5	(8, 10)
Worcester Pearmain			1.5	(8, 10)
Yellow Newtown	34	2.0	6.0	Present paper

placing in the empty food dish and leaving until eaten or by feeding by hand after which the regular ration was supplied. The feeding periods are indicated in table 2.

TABLE 2

VARIETY OF APPLE	SEASON FOR BEST USE	PERIOD OF FEEDING			REMARKS
		Vitamin A	Vitamin B	Vitamin C	
Delicious	Oct. to Jan.	2/13–5/20	3/15–6/3	2/15–6/25	Long storage
Yellow Newtown	Jan. to July	5/5–8/19	6/5–8/19	5/1–7/30	Normal storage
Rome Beauty	Nov. to March	4/4–7/4	3/15–6/3	4/6–7/5	Long storage
Stayman Winesap	Nov. to Feb.	2/13–5/20	3/15–6/3	3/2–7/5	Long storage
Winesap	Dec. to June	5/5–8/19	6/5–8/19	5/1–7/30	Normal storage

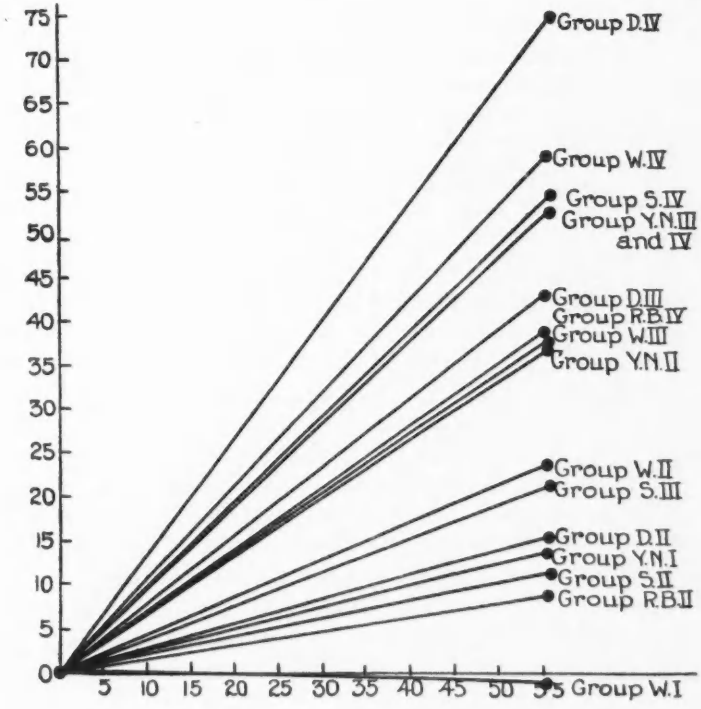

FIG. 1. GRAPHIC REPRESENTATION OF THE WEIGHTS GAINED DURING THE EXPERIMENTAL PERIOD BY THE VARIOUS GROUPS OF RATS RECEIVING DIFFERENT AMOUNTS OF FIVE VARIETIES OF APPLES

The initials following the group indicate the variety of apple being fed. Thus D equals Delicious; W equals Winesap. The number of the group indicates the amount of apple fed. (I) equals 0.5 gram; (II) equals 1.0 gm.; (III) equals 2.0 gms. and (IV) equals 4.0 gms.

In general the same procedure was followed as that already described (22). In the vitamin A tests the apples were fed at 0.5, 1.0, 2.0 and 4.0 gram levels. For further details, the reader is referred to the preceding reference.

The potency in vitamins A and C of the different varieties of apples has been expressed in terms of Sherman units per ounce. We used the

TABLE 3

The figures in this table show the average gain in weight of the various groups receiving different amounts of apple. The number of Sherman units per ounce is calculated from this data.

GROUP	DIET SUPPLEMENT	AVERAGE INITIAL WEIGHT	AVERAGE FINAL WEIGHT	AVERAGE TOTAL GAIN	SHERMAN UNITS PER OUNCE	DAYS DEPLETION PERIOD
R.B. 1	0.5 gram Rome Beauty	121	—	—	—	40
2	1.0 gram Rome Beauty	132	141	9	11+	40
3	2.0 grams Rome Beauty	142	135	−7	—	40
4	4.0 grams Rome Beauty	132	171	39	12	40
D. 1	0.5 gram Delicious	69	—	—	—	40
2	1.0 gram Delicious	85	101	16	20	40
3	2.0 grams Delicious	84	127	43	27	40
4	4.0 grams Delicious	88	163	75	23.5	40
S. 1	0.5 gram Stayman	100	—	—	—	40
2	1.0 gram Stayman	93	105	12	15	40
3	2.0 grams Stayman	85	107	22	14	40
4	4.0 grams Stayman	106	161	55	17	40
W. 1	0.5 gram Winesap	111	110	−1	—	40
2	1.0 gram Winesap	107	134	+24	30	40
3	2.0 grams Winesap	123	161	+38	23+	40
4	4.0 grams Winesap	136	195	+59	19	40
Y.N. 1	0.5 gram Yellow Newtown	109	123	+14	35	40
2	1.0 gram Yellow Newtown	103	138	+35	44	40
3	2.0 grams Yellow Newtown	121	174	+53	33+	40
4	4.0 grams Yellow Newtown	120	173	+53	16+	40

Sherman unit for vitamin B in expressing the unitage of the vitamin B complex. Reference to figure 1 and to table 3 shows, that the richest source of vitamin A in the varieties tested occurred in the Yellow Newtown with the Winesap, Delicious, Stayman and Rome Beauty following in decreasing values in the order named. In terms of units per ounce, the Yellow Newtown was found to have a value lying between 32 and 36

units; the Winesap one lying between 24 and 28 units; the Delicious one of about 24 units; the Stayman, 17 and the Rome Beauty, 12.

PATHOLOGICAL CONDITIONS ASSOCIATED WITH VITAMIN A DEFICIENCY

A careful autopsy record was maintained. Examination of table 4 will give detailed information. As has been noted by one of us (23), the appearance of gastric erosions was quite a constant feature in animals suffering deprivation of vitamin A. In this series, 55 per cent showed definite evidence of gastric lesions. Here, too, it will be noted that the frequency and severity of gastric pathology increases as the amount of vitamin A diminishes.

A further point in connection with the pathological findings is in regard to the minimal amount of vitamin A necessary for complete protection against any of the conditions usually associated with a deficiency of vitamin A. In an earlier report (22) the assertion was made that "the white rat needs at least 2.5 units of vitamin A per day in order to prevent the development of those gross conditions usually attributed to a lack of this vitamin." Table 4, however, shows that the Delicious apple, having a potency of 24 units of vitamin A, was able to confer almost total protection to the group receiving 2 grams per day. This is equivalent to 1.6 units per day. The group receiving 4 grams (3.2 units) was as healthy as the average positive control. If a group had received 3 grams (2.4 units), it would have closely approximated the minimal protective dose. The animals receiving 4 grams of Stayman apple per day showed the best protection. Since the Stayman has a potency of 17 units, this is equal to each animal receiving 2.27 units per day. If the potency of the Stayman could be raised to 18 units, the minimal protective dose would again be 2.4 units. The Rome Beauty was unable completely to protect the group receiving the highest allotment. Since this apple assayed 12 units, the group getting 4 grams a day was receiving only 1.6 units. Assuming that 6 grams would have conferred complete protection again places the minimal protective dose at 2.4 units. With the Winesap, 2 grams daily were almost able to protect completely. With a unitage of 26, this equals 1.73 units per day. Four grams (3.46 units) gave complete protection. Three grams (2.6 units) would probably be very near the minimal protective dose. Two grams (2.27 units) of the Yellow Newtown did not protect completely, while 4 grams (4.54 units) did. Thus we see that 2.4 units per day are about the least amount of vitamin A that will protect animals from all signs of vitamin A deficiency. Anything less than this permits deficiency signs to develop; more

TABLE 4

This tabulation shows the incidence of the lesions characteristic of vitamin A deficiency. One, 2, 3 and 4 plus signs indicate roughly the severity of the lesion. The plus-minus sign indicates a trace. Note that the group receiving 2 grams of Delicious was almost completely protected from all signs of vitamin A deficiency; for the Stayman, 4 grams; none of the groups receiving Rome Beauty were completely protected; for the Winesap, complete protection lies between 2 and 4 grams as is also true for the Yellow Newtown. Note that 60 per cent of the animals showed stomach and intestinal lesions.

GROUP	RAT	RESPIRATORY TRACT			GASTRO-INTESTINAL TRACT		URINARY TRACT		Eyes	REMARKS
		Lungs	Nasal sinuses	Middle ear	Stomach + intestines	Tongue abscesses	Cystitis	Pyelonephrosis		
R.B. I	1	++++	++++	+++		++	++++ Stones		++	Died pneumonia
	2	++	++++	+	+++	++	++++		++	Died peritonitis—bladder ruptured
	3	+	+	+	++++	++	++ Stones		+	Survived
	4	+	?	?	+	+++	++			Died starvation—legs weak—head eaten
R.B. II	5	+		++	+				++	Survived
	6	+++	++++	+++	++	+	+++	+++	±	Died pneumonia and uremia
	8	++	++		+	+++				Survived
R.B. III	9	+++		+	++	+++				Survived
	10♂	++	+		±	++			+++	Survived
	11			+	++				+	Survived
	12	++		+	±	+			+	Survived
R.B. IV	13			+	±					Survived
	14	±		+	±	++			++	Survived
	15	++		±	±				++	Survived
	16				±					Survived
D. I	21	++		+++		++	++++	++	±	Died uremia
	25	++++	±		+					Died pneumonia
	22	++	+	+	±		+	+	±	Died pneumonia
	20	+++	+++			+	+			Died pneumonia
D. II	23	+	++++	++++	+	+++	++			Died starvation—legs weak
	26		+						+	Survived
	52♂	±	+	+	++	+	+++	+	+	Died—legs weak
	24	++	++++	+	+++		+		+++	Died pneumonia and gastric hemorrhage

D. III	39				±					Survived
	45		+	+						Survived
	40									Survived
	43	+++	+	+						Died pneumonia
D. IV	50	+			++					Survived
	42									Survived
	48 ♀				++					Pregnancy—survived
	46									Survived
S. I	34 ♀		+		+		+++		+++	Died uremia—legs weak
	35	++	?	?	+	?	++	+++	+	Died uremia—head eaten
	33	++	++++		++	++	++++ Stones	++	+	Died uremia
	27	+++	?	?			+++		+	Died pneumonia—legs weak—head eaten
S. II	32	+++			+		+++	++	+	Died pneumonia
	30	+++	+++		++		+++	±	+	Died pneumonia
	29	+++			+++	+	++		+	Died pneumonia
	36			+			+		+	Survived
S. III	44	+++	±				+++		++	Died pneumonia
	38		+		++	+				Survived
	41	+++	±				++	++	+	Died pneumonia
	53	+	+		+				+++	Survived
S. IV	31				±					Survived
	51				+					Survived
	37	+			±					Survived
	28		+		±					Survived
W. I	21	+++			++		++++	++		Died peritonitis
	22 ♂		+	++	+				++	Survived
	23 ♂		++	+++	+++	++	++			Survived
	24	++++	++++	+	++	++++	+		+	Died pneumonia
W. II	25 ♀		+	++						Survived
	26 ♂				++				++	Survived
	27 ♂	++++	+++	++	+	+			+	Died pneumonia
	28 ♀				+		++			Survived

TABLE 4—*Concluded*

GROUP	RAT	RESPIRATORY TRACT			GASTRO-INTESTINAL TRACT		URINARY TRACT		Eyes	REMARKS
		Lungs	Nasal sinuses	Middle ear	Stomach + intestines	Tongue abscesses	Cystitis	Pyelonephrosis		
W. III	29♀	++		++	++					Survived
	30♂			+						Survived
	31♀									Survived
	32♂				++				++	Survived
W. IV	1♀			+						Survived
	2♀									Pregnancy—survived
	3♂	+		++						Survived
	4♂									Survived
Y.N. I	5	+			++		+		+	Died gastric hemorrhage
	7♂		+++	++	++		+++	++	++	Survived
	8♀	++	+	+	+++				+	Legs weak—survived
Y.N. II	9♂	+++	++	++	+++	++	+++		++	Survived
	10♂	++	+	++	++	++	++		++	Survived
	11	++			++				+	Died pneumonia
	12♂			+	++	+++			++	Survived
Y.N. III	13♀	++			+++		++		+	Survived
	14♂		++	+	+					Survived
	15♂		+	++						Survived
	16♂		+++	++	++					Survived
Y.N. IV	18♀	+								Pregnancy? survived
	19♀	++								Pregnancy? survived
	20♂			+						Survived
	6♀	++			+					Survived
	17				++++					Died from hemorrhage into stomach and intestines second day of experiment

tends to build up a reserve. The earlier assertion that 2.5 units is a minimal protective dose is thus slightly modified. If future work further corroborates the conclusion that 2.4 units of vitamin A are the minimal protective dose, a careful autopsy score could be used in assaying the vitamin A potency of food materials. Using the closest whole number available, the application of such a method to the apples used in these tests gives the results shown in table 5.

TABLE 5

VARIETY OF APPLE	FRACTION OF OUNCE	M.P.D.	UNITS PER OUNCE
Delicious	30/3	2.4	24
Stayman Winesap	30/4	2.4	18
Rome Beauty	30/6	2.4	12
Winesap	30/3	2.4	24
Yellow Newtown	30/2	2.4	36

PROCEDURE AND RESULTS OF VITAMIN B TESTS

Animals were raised and selected in the same manner as described for the vitamin A tests, with the exception that during the depletion period cod liver oil was added to the basal diet and yeast removed. Four rats were placed in each group and fed graded amounts of apple until an amount was found which provided for a distinct gain in weight. Ten grams of Delicious allowed a weight gain closely approximating 3 grams per week. Ten grams of Stayman were sufficient for maintenance only. A higher inclusion was not fed. Ten grams of Rome Beauty stimulated a growth averaging 4.5 grams per week. At 10-gram levels sufficient growth was accomplished to warrant ascribing to both Yellow Newtown and Winesap a potency of 2 units. The Delicious was accorded a unitage of 3; Rome Beauty 4.5, and Stayman less than 2. Thus the 5 varieties studied cannot be considered as rich sources of this complex. Gross observations did not afford much evidence of any marked imbalance in the relative amounts of vitamins B and G. Some animals manifested muscle weakness and convulsions while others showed an extreme shagginess of hair. Previous work (17, 18) has shown very slight difference in the B_1 and B_2 content of the apple.

PROCEDURE AND RESULTS OF VITAMIN C TESTS

Fifty guinea pigs weighing 314 $\pm$ 54 grams were arranged into 20 groups of 2, 3 or 4 each. Four groups receiving 8, 12, 16 or 20 grams of

apple were assigned to each variety of apple tested. Group XIII (Yellow Newtown) received 8 grams the first 40 days of the test, and finished the last 50 days with 5 grams. The negative controls died within 22 days; those receiving a supplement of 8 grams (with the exception of the animals getting Yellow Newtown) died within 22 to 60 days. The results with the remaining animals may be seen in table 6.

TABLE 6

GROUP NO.	G.P. NO.	WEIGHT GAINED OR LOST	REMARKS
II	1x S.	57 per cent gained	Survived
	2x S.	33 per cent loss	Died on 90th day
III	5 S.	30 per cent gain	Survived
IV	7 S.	7 per cent gain	Survived
	8 S.	15 per cent gain	Survived
VI	4 R.B.	4 per cent gain	Survived
VII	5 R.B.	63 per cent gain	Survived
	6 R.B.	36 per cent gain	Survived
VIII	7 R.B.	64 per cent gain	Survived
	8 R.B.	77 per cent gain	Survived
X	3 D	50 per cent gain	Survived
	4 D	70 per cent gain	Survived
XI	5 D	12 per cent gain	Survived
	6 D	33 per cent loss	Survived
XII	8 D	75 per cent gain	Survived
XIII	1 Y.N.	10 per cent gain	Survived*
	3 Y.N.	16 per cent gain	Survived*
XIV	4 Y.N.	63 per cent gain	Survived
	5 Y.N.	33 per cent gain	Survived
	6 Y.N.	60 per cent gain	Survived
XV	7 Y.N.	71 per cent gain	Survived
	8 Y.N.	68 per cent gain	Survived
XVI	10 Y.N.	95 per cent gain	Survived
	12 Y.N.	99 per cent gain	Survived
XVIII	16 W.	18 per cent gain	Survived
XX	22 W.	70 per cent gain	Survived
	24 W.	124 per cent gain	Survived

* Received 8 gms. the first 40 days of the test and 5 gms. the last 50 days.

Since units of vitamin C are determined on the bases of the minimal amounts necessary to protect a guinea pig from scurvy over a 90-day period, it will be seen that the unitage per ounce of the different varieties of apples tested is as follows: Stayman, Rome Beauty, Delicious and Winesap 2.5 units; Yellow Newtown 6 units. Inspection of the weight increments on the larger inclusions will reveal the fact that occasionally the higher inclusions are not so productive of weight gains as those which

occurred when smaller amounts were fed. This is probably due to a reduced consumption of the basal food mixture because of the larger apple quotas. The establishment of the vitamin C unitage on arbitrary levels of supplement does not allow for such differences as greater weight increments or variations in general appearance and activity. Obviously such differences appear only when there is a marked difference in the potency of the supplements and a wide spacing of each level. At the 12-gram level the Delicious and Stayman provided for better growth than the Rome Beauty and Winesap. The fact that the Winesap showed slightly better results than the Rome Beauty might be accounted for on the basis of slight deterioration of the vitamin in the latter variety due to a longer period of storage. At the 20-gram level this relationship is reversed. These observations would seem to indicate that the Delicious and the Stayman are almost one unit richer in vitamin C than the Rome Beauty and the Winesap.

DISCUSSION

Steenbock (24) was the first to call attention to the fact that "the fat-soluble vitamin is a yellow plant pigment or closely related compound." Since that time it has been shown that carotene, while not identical with vitamin A, is capable of being converted by the animal organism into vitamin A. Palmer (25) called attention to the fact that the relationship existing between the vitamin A content and the yellow color of corn may be a genetic one, in which case it should be possible to transfer the vitamin to white corn. Hauge and Trost (26) showed that the inheritance of endosperm color in maize is typically Mendelian in nature. Later Mangelsdorf and Fraps (27) conducted an inquiry into the quantitative relationship between vitamin A in corn and the number of genes for yellow pigmentation. They state that since the endosperm of corn is triploid in its chromosomal constitution, it is possible to produce 4 classes of seed differing in the proportion of dominant and recessive genes. In the case of the factor for yellow pigmentation, the cells of the endosperm may have 0, 1, 2 or 3 genes for yellow pigment. These 4 classes differ in color and may be described roughly as white, pale yellow, dilute yellow and deep yellow. These authors found that there is a high degree of correlation between the number of genes for yellow pigment and the number of units of vitamin A. The number of vitamin A units per ounce for the 4 varieties was found to be, on the average, as follows:

0 yellow genes	0.15
1 yellow gene	67.50
2 yellow genes	150.00
3 yellow genes	225.00

Are the factors which govern inheritance and transmission of those characteristics responsible for the production of vitamin A in corn peculiar to this food material only, or may they be applied to other plant foods? Steenbock's original observation has been amply proved by numerous investigators. The vitamin A content of the yellow yam, for example, is 4 times that of the white variety (29). The yellow yautia has nearly 20 times as much vitamin A as the white variety (29). The yellow carrot is 80 times as rich in carotene as the white (30).

Thus there is evidence that the production of vitamin A (carotene) is due to the presence of a gene for yellow color. Recent work also indicates that the production of vitamin C may be dependent upon genetical factors. Crane and Zilva (10) stated that the cultivated varieties of apples fall into 2 groups as far as the chromosome number is concerned: the diploid with 34 chromosomes and the triploid with 51. The derivation of the chromosome set 17 and its multiples from a primary haploid number by progeny tests is, as yet, a subject of too much dispute to justify any particular arrangement of the chromosomes. Such an arrangement, moreover, may be unnecessary in view of the suggestion of Crane and Zilva (10b) that "triploid apples reveal a tendency to possess a higher vitamin C content than diploids." In subsequent work (10b) these authors tested additional triploid varieties to obtain, if possible, further evidence of the association of vitamin C with the chromosome number. As a result of this additional work, they concluded that "the results, although suggesting that some connection may exist between the chromosome number and the antiscorbutic activity of the apple, do not supply incontrovertible evidence to that end."

As a matter of fact, Key (31) subjected this suggestion to further experimental tests by examining diploid and tetraploid tomatoes for their vitamin C content. The chromosomal constitution of the tomato and its reproductive habits are much simpler and better understood than those of the apple. Key was unable to demonstrate any difference in the vitamin C content of the 2 varieties. She concluded that "the number of chromosomes is not the sole factor controlling the vitamin C content." Sansome (31) in commenting on her results, said that "the genetic constitution of the original diploid may be such that the vitamin content was already saturated and the effect of increased chromosome number was not observable. Original diploid plants of different constitution might, therefore, give different results." It seems more plausible to assume that the presence and activity of a certain gene are responsible for the production of ascorbic acid and that the presence and activity of

another gene are responsible for the production of carotene. The actual number of chromosomes, therefore, is not the significant point but rather the presence or absence of these particular genes and the facilitating or inhibiting influences exerted upon these by the activities of an unknown number of other genes. Jennings (32) states that "innumerable examples can be given of the alteration, by environmental conditions, of the characteristics produced by genes. . . . . The rôle of environment differs greatly with respect to different characteristics." In this respect Wallace and Zilva (33) have produced evidence more directly bearing on the point under consideration, namely, the possible effect of experimentally altered environment on the vitamin C potency of apples. They were able to show that there exists an inverse ratio between nitrogen content and vitamin C activity and that nitrogen content can be altered by two methods: by substituting grass for arable culture and by the operation of bark-ringing vigorous trees. By these two methods the nitrogen content was lowered and the vitamin C and total sugar content increased.

A re-arrangement of the data found in table 1 in respect to the chromosome number and the vitamins A and B content will give the results shown in table 7.

It will be seen in table 7 that in no instance has the vitamin A potency of a triploid been determined. It has been suggested (34, 39) that the genes responsible for vitamin appear to be a separate series of duplicate genes, the inheritance of which is unknown. These genes work cumulatively since there is a tendency for triploids to show higher values than diploids. There is a belief among geneticists (35) that multiple factor inheritance produces a continuous series of values rather than a discontinuous series based upon different dosages of the same factor. In accordance with this belief one might expect to find among triploids some varieties showing a high vitamin potency. Moffett (36) has stated that out of 91 varieties of apples that have been examined cytologically, only 27 are triploids.

In the above tabulation appear 6 varieties of apples in which both the vitamin A and vitamin C values have been determined. If these varieties be arranged in an ascending series according to their vitamin A values, it will be found that, with one exception, the McIntosh, the vitamin C values will be similarly arranged. Potter (20) determined the vitamin A values of the McIntosh, Golden Delicious and Starking from data derived from a 35-day experimental period. We believe that her values may be a little too high because of this. It would seem ad-

visable to re-determine the vitamin A values of these varieties and at the same time ascertain their antiscorbutic potency.

There is an inherent difficulty, based upon the methods employed, in comparing vitamin A and vitamin C values. Vitamin A potency is based on weight gain over a definite period of time. So long as the weight gain is under maximum, weight increments will be graded according to the amount of vitamin containing supplement fed. If too little be fed,

TABLE 7

VARIETY OF APPLE	CHROMOSOME NUMBER		UNITS VITAMIN A	UNITS VITAMIN C
McIntosh	34		33	1.0
Worcester Pearmain	34		*	1.5
Gravenstein		51	*	1.5
Jonathan	34		7	1.2–1.5
Cox's Orange Pippin	34		*	1.5
King Edward VII	34		*	1.5
Blenheim Orange		51	*	1.5–3.0
Warner's King		51	*	1.5–3.0
Ribston Pippin		51	*	1.5–3.0
Stayman	34		17	3.0
Rome Beauty	34		12	3.0
Delicious	34		24	3.0
Winesap	34		26	3.0
Lane's Prince Albert	34		*	3.0
Newtown Wonder	34		*	3.0
Reinette du Canada		51	*	3.0
Gennet Moyle		51	*	3.0–6.0
Baldwin		51	*	5.0–7.5
Yellow Newtown	34		34	6.0
Bramley's Seedling		51	*	6.0–10.0
Belle de Boskoop		51	*	6.0–10.0
Starking	34		16	*
Golden Delicious	34		30	*

* Vitamin not determined.

gain in weight is not possible, and if more is fed than is necessary to produce a maximum gain in growth its influence cannot be measured by this method. If the vitamin containing supplement must be fed in quantities so large as to effect a reduction in the essential basal ration to a point that is incompatible with growth, difficulty is encountered again in assaying the potency of the supplement in respect to its vitamin content. Because of such considerations, only those groups of experimental animals receiving supplements which are stimulative of growth gains below the

maximum are used in estimating unitage. When these limitations are observed fairly consistent results for vitamin A may be obtained over several levels of supplement fed. The reinforcement of the results obtained at one level, by those from other levels, is a point decidedly in favor of the method.

The determination of vitamin C potency, however, is an entirely different matter; here the final verdict depends almost entirely upon the results obtained from one group and, unless that group be large, individual variations may create an element of doubt as to the reliability of the decision. The supplement is fed in graded amounts with the hope that one level will be found in which the supplement is barely sufficient for protection. This constitutes the crucial group. Sometimes there is more or less uncertainty as to what size the supplements should be; this might be offset by running a larger series in which a level, exactly sufficient for protection, would be more likely to be found. It is considered highly fortunate in a series containing 5 or 6 levels, to find one precisely meeting the requirements. Usually in vitamin C experiments, the levels selected are 3, 5, 10, 15 and 20 grams or 4, 8, 12, 16 and 20 grams. Thus it will be seen that the arbitrary selection of the size of the supplement fed predetermines, to a considerable degree, the unitage that will be reported. The assignment of 3 units as the antiscorbutic potency of an apple does not imply the same accuracy as when designated for vitamin A. It means that 10 grams of apple were protective, while the next lowest of 3 or 5 grams was insufficient. The method provides no means for covering intermediate levels except by actually feeding them.

It will be recalled that Potter (20) is responsible for the statement that the richness of the apple in vitamin A is not proportional to the yellow color. Our results are not quite in agreement with this. The Yellow Newtown possesses a yellowish flesh and was found to have the highest vitamin A potency. The Winesap, Stayman, Starking and Golden Delicious, all tinged with yellow, have a potency ranging from 16 to 30 units, while the Rome Beauty, a white-fleshed apple, has a potency of only 12 units. Thus far the comparison is distinctly in favor of the original observation of Steenbock. The Delicious and McIntosh, however, both white-fleshed varieties possessing a vitamin A potency of 24 and 33 units, respectively, are just as rich sources of this vitamin as the Stayman and Winesap, two yellow-fleshed varieties. While we agree in general with Potter's contention, we prefer to place the emphasis on the fact that a white-fleshed variety is capable of showing as much vitamin A activity as a yellow one and that, among the yellow varieties, the po-

tency greatly exceeds what one would expect from the richness of the yellow color. The Yellow Newtown, the richest source of vitamin A and the yellowest-fleshed variety herein reported, does not compare in yellow color with the orange, yet it yields nearly twice as much vitamin A as the orange. Yellow color, however, is not entirely dependent upon the presence of carotene. Geneticists (35) recognize at least two factors active in the development of yellow color. The query naturally arises as to what extent the apple is dependent for its vitamin A activity on the presence of carotene *per se*. Can it be that the apple possesses some substance other than carotene, capable, when ingested, of either replacing the vitamin or of sparing it?

Roughly to classify apples as a fair source of vitamin A (37) no longer seems to be justified, yet several *varieties* of apples are as good or better than the orange as a source of this vitamin.

The idea that vitamins are elaborated by the activity of an individual's own genes is not a new one. Jennings (32) says: "The facts as to the vitamins and their effect on development show that not all the substances required for normal development are elaborated through the action of the individual's own genes." Plants are capable of elaborating many substances that animals cannot. With respect to vitamins, however, the analogy is not complete. Vitamin D, for example, may be produced in the skin by the action of ultraviolet irradiation, vitamin A by the action of the liver upon carotene obtained from outside sources. It remains to be seen what position the other vitamins occupy in this respect. It seems to be well established that certain conditions in the internal and external environment may make it difficult if not impossible for the organism to synthesize vitamins A and D. Substitution or replacement therapy may then be employed much the same as in endocrine therapy.

As far as the writers know, no animal is known that is not susceptible to a deficiency of vitamin A. This is not the case with vitamin C since animals may be divided into two groups according to whether they require or can synthesize the vitamin. Rats, birds, cattle and dogs can synthesize vitamin C, while guinea pigs, rabbits, monkeys and man are dependent upon its presence in their foods (38).

CONCLUSIONS

1. The vitamin A value of the Delicious apple is 24 units per ounce; Rome Beauty, 12 units; Stayman, 17; Winesap, 26; and Yellow Newtown, 34. On the basis of other considerations mentioned in this paper, the above figures could be corrected to the following values: 24, 12, 18, 24 and 36.

2. The vitamin C content of the Delicious, Rome Beauty, Stayman and Winesap is 3 units, while that of the Yellow Newtown is 6.

3. The vitamin B complex of the Yellow Newtown, Winesap and Stayman is 2 units; Delicious, 3 units; and Rome Beauty 5 units.

4. The minimal protective dose of vitamin A previously reported as 2.5 units, is now found to be 2.4 units.

5. A method is discussed for determining the vitamin A potency of a given material by finding the minimal protective dose (M.P.D.) of that material and ascribing to it a unitage of 2.4.

6. Reasons are advanced for believing that apples may possess a substance, other than carotene, which possesses vitamin A activity.

7. It is suggested that the vitamins A and C contents of the apple, for example, are more closely correlated with gene activity than with chromosome number; that the factors responsible for these vitamins appear to be separate series of duplicate genes whose inheritance is unknown. These genes apparently work cumulatively since there is a tendency for triploids to show higher values than diploids.

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BIBLIOGRAPHY

(1) Holst, A. and Frohlich, T.: Ztschr. f. Hyg. u. Infektionskr. 72:1, 1912
(2) Robinson, R.: J. Roy. Army M. Corps 32:53, 1919
(3) Chick, H.: Brit. M. J., 2:147, 1920
(4) Givens, M. H., McClugage, H. B., and Van Horne, E. G.: Am. J. Dis. Child. 23:210, 1922
(5) Kohman, E. F., Eddy, W. H., and Carlsson, V.: Indust. and Engin. Chem. 16:1261, 1924
(6) Van Leersum, E. C. and Hoogenboom, N. P.: Nederl. tijdschr. v. genecsk. 74:5127, 1930
(7) Bracewell, M. F. and Zilva, S. S.: Biochem. J. 25:1081, 1931
(8) Bracewell, M. F., Hoyle, E., and Zilva, S. S.: Biochem. J., 24:82, 1930
Bracewell, M. F., Kidd, F., West, C., and Zilva, S. S.: ibid. 25:138, 1931
Bracewell, M. F. and Zilva, S. S.: ibid. 25:144, 1931
(9) Scheunert, A.: Der Vitamingehalt der Deutschen Nahrungsmittel. Berlin: Julius Springer, 1930
(10) a. Crane, M. G. and Zilva, S. S.: Biochem. J. 26:2177, 1932
b. Crane, M. G. and Zilva, S. S.: J. Pomology and Hort. Sci. 9:228, 1931
(11) Vitamins: A Survey of Present Knowledge. Special Report Series, No. 167, page 211
(12) Potter, M. T.: J. Home Economics 25:52, 1933
(13) Hessler, M. C., Anderson, R. E., and Eisenbarth, E.: Exper. Station Rec. 63:790, 1930
(14) Fellers, C. R., Isham, P. D., and Smith, G. G.: Proc. Am. Soc. Hort. Sci. 29:93, 1932

(15) OSBORNE, T. B. AND MENDEL, L. D.: J. Biol. Chem. 42:465, 1920
(16) WEATHERBY, L. S. AND WATERMAN, E. W.: J. Indust. and Engin. Chem. 20:968, 1928
(17) ROSCOE, M. H.: Biochem. J. 25:2050, 1931
(18) DAY, P. L. AND DARBY, W. J.: Am. Chem. Soc., Division Biol. Chem. Meeting 3:28, 1932
(19) MUNSELL, H. E.: J. Home Economics 22:680, 1930
(20) POTTER, M. T.: J. Nutrition 6:99, 1933
(21) MORGAN, A. F. AND FIELD, A.: J. Biol. Chem. 82:579, 1929
(22) MANVILLE, I. A. AND CHUINARD, F. G.: J. Am. Dietet. A. 8:504, 1933
(23) MANVILLE, I. A.: Am. J. Physiol. 105:70, 1933
(24) STEENBOCK, H.: Science 50:352, 1919
(25) PALMER, L. S.: Science 50:502, 1919
(26) HAUGE, S. M. AND TROST, J. F.: J. Biol. Chem. 80:107, 1928
(27) MANGELSDORF, P. C. AND FRAPS, G. S.: Science 73:241, 1931
(28) AXTAMYER, J. H. AND COOK, D. H.: Am. J. Trop. Med. 12:317, 1932
(29) QUIIN, E. J. AND COOK, D. H.: Am. J. Trop. Med. 8:503, 1928
(30) BILLS, C. E. AND MCDONALD, F. G.: Science 76:108, 1932
(31) KEY, K. M.: Biochem. J. 27:153, 1933
(32) JENNINGS, H. S.: The Biological Basis of Human Nature. New York: W. W. Norton, 1930, page 127.
(33) WALLACE, T. AND ZILVA, S. S.: Biochem. J. 27:693, 1933
(34) NEBEL, B. R.: Personal communication.
(35) CLAUSEN, R. E.: Personal communication.
(36) MOFFETT, A. A.: J. Pomology and Hort. Sci. 9:100, 1931
(37) MENDEL, L. B.: J. A. M. A. 98:1986, 1932
(38) BROWNING, ETHEL: The Vitamins. Monographs of the Pickett-Thomson Research Laboratory, Volume I, September 1931, page 333
(39) BRESSMAN, E. N.: Personal communication.

EDITORIAL

Total Energy Exchange in Relation to Clinical Medicine[1]

We need, according to DuBois, to apply our knowledge of total metabolism more effectively to the need of the individual patient. Total metabolism is recognized by clinicians in the adjustment of diets in diabetes, obesity, and in the feeding of children. Dietitians study the total metabolism in institutional feeding, and even for whole populations in time of war. It might be added that more than ever is total metabolism being considered in planning emergency relief rations in coöperation with the medical and dietetic professions. Is total energy metabolism considered to the same extent with the individual patient?

Basal metabolism is important in diagnosis, but a true basal condition lasts only four or five hours out of a twenty-four hour period. A very light breakfast before an appointment at the laboratory will raise the basal rate 2 to 5 per cent. The tired, apprehensive or uncomfortable patient may give a reading 10 to 30 per cent above the basal. Only when the patient is lying quietly in bed do conditions approximate the basal state.

The stimulating effect of food, or the "specific dynamic action," is a factor of minor importance in many instances. A heavy meal of protein or carbohydrate may elevate the metabolism 20 to 30 per cent for a few hours, but may amount to no more than 6 per cent of the total calories consumed in twenty-four hours. This information should help to discourage the tendency to use low protein diets for the purpose of lowering the "cost of digestion"; it should be realized that this temporarily stimulating effect is only a minor consideration in relation to total energy expenditure.

The most important factor in total energy metabolism is muscular exercise. From a clinical standpoint the basal metabolism may be considered as a plateau of expenditure on which are superimposed wave-like increases from the specific dynamic action of food, and sharp peaks from muscular exercise. Caloric debts incurred by such exercise are not paid at once, but are distributed over a period of recovery.

The protein metabolism is unaffected by muscular exercise, but depends on the protein content of the food; or if the intake is restricted, it depends on an inherent body level of protein destruction which in health

[1] Abstract and comments on paper presented by Eugene F. DuBois, M.D., before the Graduate Fortnight of the New York Academy of Medicine, October 23, 1933, and published in the Bull. New York Acad. Med. for Jan. 1934.

is rather low, but which is distinctly high in certain toxic diseases. When the body is in approximate nutritive balance, the food-stuffs that are oxidized are about the same as the food ingested. If an excess of food is taken, fat is stored; and insufficient intake forces the use of body stores. Since most patients with acute diseases are on low diets, the mixtures of protein, fat and carbohydrate being metabolized are very different from the mixtures being supplied as food. Nature makes an attempt to adjust the expenditure, and in undernutrition the basal metabolism may fall as much as 20 to 40 per cent. An excess of food tends to raise the metabolism only a small percentage, and a gain in weight results when this excess food is not burned.

The total metabolism must be considered in exophthalmic goiter, fever, leukemia, and in patients suffering from dyspnea. How can the total metabolism be best adjusted so that it exceeds the basal by the smallest possible margin? Since muscular exercise so markedly influences metabolism, it should be reduced first; therefore rest becomes a most important therapeutic measure, which has not always been analyzed on a physiological basis. Its close relation to oxygen consumption by the body cells relates an increase in metabolism very closely to an increase in blood velocity, and increased pulse rate and an increased cardiac output. Increased oxygen consumption and carbon dioxide output result in a rise in coronary circulation and in the work imposed upon the lungs. In normal persons the total metabolism for long periods is closely paralleled by the appetite, and food intake with weight loss and gain is parallel to the discrepancy between total metabolism and total intake.

In severe anemia the oxygen capacity of the blood is reduced, even when the patient is absolutely quiet. An increase in the total metabolism caused by any of the factors mentioned can only fall directly on an already overtaxed circulatory system. The adequacy of the velocity of blood flow can be decided, according to Blumgart, only in relation to the metabolic rate of the particular patient. The whole problem of management of heart disease seems to depend upon the relationship of the demands of total metabolism and the needed cardiac output, with the capacity of the organism to meet those demands. How much increased work should be allowed, as well as its distribution throughout the day, for the effects of restlessness, excitement, etc.? McCann, as early as 1921, pointed out that the best diet in pulmonary tuberculosis was one that made allowances for the considerably reduced vital capacity and provided the total energy requirement in a form that would decrease pulmonary ventilation. From a theoretical standpoint, he

emphasized a moderate diet with a fairly low protein, low carbohydrate, and rather high fat content. Dietitians who have had experience in the feeding of tuberculosis patients by the traditional method, and in feeding the tubercular patient with diabetes, know that the feeding problems in the latter situation are very simple and that extreme variations in weight are eliminated.

The one factor that must parallel the total metabolism in normal persons is the appetite. Better food habits, with education in the value of food as well as moderation in intake, should be the teaching objective of every dietitian so that appetite and total metabolism needs may balance each other.

The physician may order a diet that has been estimated from determinations of the basal metabolic rate, or from tables, realizing that this provides a known error of from 10 to 15 per cent. An allowance of 5 to 10 per cent must be added to pay for the "cost of digestion" or specific dynamic effect of food; a 10 per cent addition should be made for rest in bed with additions for activity based on tables of general averages. The correctness of these calculations may be interpreted with regard to the individual patient by following his weight curve over a period of time and making further adjustments of the diet on this basis.

The Fatal Milk Bottle

"Is man to be denied even the smallest foothold in this quaking bog of modern civilization? Religion is going, the family is going, morals are going, and now milk, butter and eggs are going." The avidity with which leading editorial and press writers seize upon sensational dietary comments emanating from persons keyed to the publicity value of startling statements, is appalling. The *New York Times* for May 17, 1934, carried a prominently displayed report of a paper read before the New York State Medical Society at its annual convention in Utica. The gist of this discussion was that "As we grow older, I believe we eat too many dairy products . . . I agree with Dr. Timothy Leary of Boston that we eat too many foods high in cholesterol content as we pass the 40 mark. By that I mean butter, eggs, cream and other dairy foods." The speaker was the chief-medical examiner of a county in New Jersey. An editorial writer in a later issue of the same paper took this text to heart and puzzled over the "dizziest reversals" that "occur in the physical sciences and in dietetics," and the startling revolutions that occur particularly in nutritional theory. He interprets the good doctor's remarks to mean that "one year's food is another year's poison" and

that "a glass of milk and a slice of bread and butter make a dangerous meal for a man of 45." The thing to do, apparently, is to get out of bed at 2 a.m. and partake of pig's knuckles and sauerkraut. It is true that diet and worry may be the two things that kill people in middle age, but the saddest commentary which may be made is that the somewhat careless statements of persons prominent in the medical field are so often taken seriously and receive garbled and wide publicity. The moral is that a presentation of one person's poorly digested dietetic theories, possibly based on limited experience or knowledge of the particular subject, is always fraught with danger. Thus an opening is made for more food faddism and for further bewilderment of the many who have accepted milk as a valuable and digestible food.

CURRENT COMMENT

Personnel Changes under Economic Pressure

Among the measures adopted at Miami Valley Hospital, Dayton, Ohio, to lighten the financial load was one that required great patience and vigilance, and was considered by many to be drastic. All experienced cooks on the payroll, six in number, were replaced with young men whose main assets were youth and enthusiasm. The meat cutter was likewise replaced. These changes were made after some resentment had resulted from pay cuts, and effected a yearly saving of $2600. The net results have been improved morale and more gratifying food production. There were no ingrown habits and poor cooking methods to overcome, while at the same time the student dietitians had an unusual opportunity to lead the younger, unbiased cooks in the way they should go. The arrangement has had a discernible influence in stabilizing production. The meat cutter was taught how to cut whole carcasses to suit particular needs. The food supply at present more accurately meets the requirements of the large groups, and satisfies, as well, the variable preferences of individual patients.

The method used to determine the required number of workers in the food department was selected because of a somewhat decentralized plan of kitchens. Cooking is done, to some extent, in four of eighteen kitchens. The number of workers are in proportion to the number of people served. Twenty-nine meals per worker per day were served in 1929, 43 in 1933, and 35 at present. The last arrangement seems adequate for good administration and good service.

Twenty employees were dropped between 1929 and 1933, and together

with pay cuts, a total weekly payroll decrease of more than $500 has resulted. In 1933, 517,000 meals were served, representing a decrease of 24 per cent. As the number of meals served increases, workers are gradually added to maintain the 35 to 1 ratio.

Coöperating with Welfare Agencies

When we include under the name of welfare agencies all civic or rural relief departments, public health departments, family welfare bureaus, children's aid societies, and similar groups, it is readily seen how many opportunities present themselves to the dietitian. Many of these agencies do not, as yet, employ a dietitian or nutritionist familiar with community welfare problems, and must look for help from an outside source.

Most welfare agencies, particularly during the last five years, have directed their efforts toward the needs of the unemployed for rent and shelter, fuel, clothing, recreation, medical services and food. In regard to the food, there continues to be much confusion as to what constitutes an adequacy. It should be the duty of the nutritionist, with the support of the medical profession, to work for an adequate food allowance to all families embarrassed by unemployment. The public could be shown the necessity and economic wisdom of such an allowance. Whether it should be given in voucher form, by commissary method, or in cash, should be studied carefully with the welfare agencies.

When the outstanding nutrition needs of a community have been determined, dietitians interested in coöperative service with the welfare agencies should seek the backing of an advisory nutrition council composed of representatives from the medical, dietetic, social service, public health nursing and teaching professions. Should it be necessary to formulate a reliable standard of average adequate food supply (taking into account the need at different ages), it is essential to have such standards approved by a medical group.

The following procedures suggest the extent of the dietitian's field of service.

1. Estimate the adequacy of local relief food allowances by comparison with accepted standards. Direct public welfare officials' attention to the findings, and point out the greater food needs of the adolescent youth, commonly overlooked in relief food allowances.
2. Prepare special diet lists with reference to the use of the cheaper foods, with the sanction of local hospital and medical group for their use.

3. Educate the welfare agency workers in regard to the low cost adequate diet. A lecture course, and perhaps practical demonstrations in food preparation and food budgeting would aid them to spread the gospel of good nutrition among their clients.
4. Give individual attention to nutrition problem cases, both in the welfare clinic and the home, through the planning of food budgets and the preparation of any unknown or troublesome food, in order to encourage the mothers to attend a course of economical cookery lessons.
5. Teach nutrition courses or food study classes to groups of mothers, not only those on relief but also school groups, including teachers, in which there is no opportunity for home economics training.
6. Supervise any home-help or visiting housekeeper service which might be conducted by the welfare agencies, in an effort to secure a better standard of assistance in homes during the emergency period.

Reverberations of Food Fads in Hospital Practice

During the evolution of a science there is a fairly constant swinging of the pendulum from one extreme to the other. The present century has seen a remarkable advance in the science of nutrition and faddists have consequently flourished on the rich fare. Commercial food products, hatched from a germ of scientific truth planted in the fertile brain of a promoter, that purport to control or cure almost all known diseases, are thrust upon the public with such gigantic force that they are widely accepted and used long before the underlying scientific truth can be properly digested by the layman.

We have long been familiar with the vegetarian, the fruitarian, and the advocate of a meal a day or of longer periods of fasting. The more recent studies of acid-base balance and the identification of the vitamins have been of inestimable value to food faddists. Intoxicated by the commercial possibilities of distorted or manipulated scientific facts, they turn these facts into fads and exploit a gullible public.

The hospital, dealing with every type of idiosyncratic patient, has the food fad problem to cope with constantly. It is the dietitian's job to educate the patient in sound nutritional facts and to weed out any fads which have taken root. This is indeed a big problem, since everyone, at present, considers himself, more or less, an authority on diet. Every day we see the patient who cannot eat the simplest food, not because of dislike or probable discomfort, but merely because of ill-advised ideas with regard to the food. It is a clever dietitian who can wield a wand of diplomacy and tact that will direct her patient along scientifically charted dietary paths.

Professional Labels

Whenever a new and really worthwhile movement is under way, there are always those who will take isolated facts or principles embodied in the investigation or undertaking, distort these, and thereby sell either worthless ideas or products to a readily dupable public.

Members of the dietetic profession, as well as those in the medical and nursing fields are beset by quacks. There are individuals who call themselves "registered" or "licensed dietitians" who have had no college training in either foods, nutrition or institutional management. There are others who pose or create the impression that they are dietitians, and as such prescribe diets for the sick without benefit of medical sanction. Many of these are men. There is a record of one who was prosecuted in the state of Ohio for illegal practice of medicine, who devoted his time to carrying out dietetic fads in a school called "Rational Living." His method of initiating the treatment of stomach cases was to starve the patient for ten days, then gradually to increase the diet by the use of orange juice for several days, with final doses of large quantities of chopped raw vegetables.

Another male "dietitian" uses an elaborate "food combination chart". The foods are grouped under various headings, according to general composition, as starches, sugars, proteins and the like. It is claimed that certain foods will combine well with each other to form a suitable meal, while others will not. Scientifically, of course, there is no foundation for these preposterous claims.

Various food companies are using the name of the American Dietetic Association in order to lend credence and value to their worthless statements. Many companies will take a dietary truth, magnify its importance, and so make big sales; vitamin candies are good examples. Some food products carry the unauthorized recommendations of dietitians in their advertisements and thus further mislead the public.

Other companies are distributing products with worthless claims, and imply that they have been originated by dietitians. These firms advertise widely that their products are also being sold by graduate dietitians. If these women are really qualified dietitians, they have been able nicely to re-adjust their scientific knowledge to meet the needs of the manufacturer, and thus help sell a questionable product. So far no member of the American Dietetic Association has been known to do this type of quackery.

Such unethical practices should not be countenanced. The unauthor-

ized use of the name of the Association or that of a member, and the misuse of dietetic information, should not be tolerated.

One step in the right direction is to have an authorized and uniform procedure for the use of titles. The March JOURNAL conveyed the authority of the executive committee of the Association for the use of the title "student dietitian" to designate those taking dietetic training courses in approved hospitals. There is objection to the use of the term "dietitian intern" since the word "intern" has long been applied, in the medical profession, to a resident physician or surgeon. The decision of the executive committee should be upheld and the title "student dietitian" adhered to.

BOOK REVIEWS

The Professional Training of the Hospital Dietitian. By Helen Clarke. New York: Columbia University Bureau of Publications, 1934, pp. 96.

This book gives a detailed study of the dietetic profession in the United States. The data have been secured through the use of the questionnaire method sent to groups of approved hospitals and a selected group of colleges offering a major in food and nutrition in preparation for hospital work. The state colleges and universities in forty-nine states and territories answered the questions as to training. The hospitals approved by the American Dietetic Association up to 1933 were also asked to answer a questionnaire as to their requirements for a graduate student who enters for "interne" work.

From the data thus collected and from personal visits to twenty-five hospitals, this book has been compiled. The five chapters discuss, first, the method of investigation, second, the hospital dietitian, third, the "dietitian interne," fourth, the college curriculum for hospital dietitians during 1931–32, and fifth, a rèsumè of the present trends in academic training leading to the profession of dietetics. The bibliography of books, pamphlets and periodicals is short. The appendix includes the letter, the list of colleges, and the list of hospitals offering courses for dietitian internes. There are also included the outline for dietitian internes and the questionnaire for application of approval to be used by a hospital in qualifying for the privilege of receiving college dietitian internes.

The book contains many interesting tables indicating the trend of curriculum demands for science, and for sociological and educational training, as well as for the study of technique courses offered in colleges and universities. The data in regard to the history of the dietetic movement are limited. The mass of the data is limited to actual material as found during the two years of the investigation. It is a valuable document showing the history of the movement within the limited period.

Like all studies made on the basis of a questionnaire, its intrinsic value depends on the limitations of the questionnaire and the individuals who answer the questionnaire.

To those already in the service the factual matter is familiar. To those who are interested in understanding the training movement and the attempt of the American Dietetic Association to standardize the dietitian's work in hospitals and the dietitian's training work in colleges, it will be valuable.

ABBY L. MARLATT, *Director,*
Courses in Home Economics,
University of Wisconsin

Economies in Food. Quantity Recipes Using Evaporated Milk. By M. Faith McAuley and Mary Adele Wood. Chicago: Univ. of Chicago Press, 1934, pp. 49. Price 50 cents.

The authorship of this book is a guarantee of its value. It is designed to meet the institution food unit problem of maintaining standards of quality and of service, with a patronage reduced in numbers and in purchasing power. The authors emphasize the fact that in order to be most effective nutritionally, food must be well-prepared, attractively served, and enjoyed by the patron. In order to meet institutional needs it has been found that evaporated milk is particularly valuable. In this collection of recipes thé whole menu, with the exception of fruits and vegetables, is represented. The recipes are presented in the hope of helping to make attractive, interesting and good, without increase of cost, the food of the institution group, whether in school cafeteria, college dormitory, hospital ward, or the commercial dining-room of cafeteria, tearoom, restaurant and hotel.

The Diet of Texas School Children. By Jessie Whitacre. College Station, Texas: Texas Agricultural Experiment Station, Bull. No. 489, 1934, pp. 44.

This bulletin presents a comparison of the seasonal, regional, and racial aspects of the diet of Texas school children. The out-

standing feature in the comparisons of diets is the striking similarity between the diets in the different seasons, regions, and races. Records from either season in any region give equally satisfactory information as to the kinds of foods which the children ate.

The study indicates that one or more other factors than season of the year, the supply of locally-produced foods, or racial food habits have a greater influence in determining what kinds of foods school children eat.

Suggested Standards for House Furnishings of Residence Halls. Circular 23 in series by Institution Economics Section of American Home Economics Association. Price 20 cents.

A committee under the direction of Mrs. Bessie Brooks West has prepared this circular on furnishings, outlining suggested standards and making explanatory remarks on all types of furnishings for students' bed rooms, suites, sitting rooms, living and reception rooms, students' sitting rooms and kitchenettes, recreation rooms, business offices, linen rooms, laundries, lobbies, corridors, dining rooms, etc. This information should be particularly valuable to institutional administrators.

Many other circulars of interest to institutional managers are available for distribution from the American Home Economics Association.

Community Canning Centers. By Mabel C. Stienbarger and Miriam Birdseye. Washington: U. S. Dept. of Agriculture, Bureau of Home Economics, 1934, pp. 21.

This is an authoritative, well-prepared booklet, containing not only complete details for the selection, preparation and canning of fruits and vegetables, but complete information, as well, for the arrangement and equipment of canning centers, and a list of firms from which all types of equipment and supplies may be obtained.

Health Education Material. Chicago: National Dairy Council, 1934, pp. 31.

This booklet offers an extensive list of health education booklets and posters suitable for class room instruction and general use.

Jimmy Chew. By Harrison W. Ferguson, D.D.S. Chicago: Good Teeth Council for Children, 1934, pp. 32.

This little booklet for children has been approved by child health workers and nutritionists. While it does not pretend to give physiological information, it should arouse the interest of children in the importance and care of their teeth.

Thoughtful Planning for the Low Income. Distributed by the Home Economics Committee, Family Welfare Society, Providence, R. I.

This leaflet gives menus, grocery orders, budget and economy hints for a family of five who must live on $16 a week.

Hay Dieting. By Josephine Boyer and Katherine Cowdin. New York: Charles Scribner's Sons, 1934, pp. 384. Price $3.00.

The pleasingly artistic cover and makeup of this book provide a soothing background for another presentation of the inconsistencies of the Hay diet. Here we are offered the delightful vista of the "pleasures of the table" combined with a freedom from "headaches, blues, biliousness, indigestion, catarrhs, colds" and the "ever-present fear of disease." We glance through the book, amazed at the labored and ingenious schemes for separating protein from his enemy, carbohydrate, and marvel at the simplicity of those favored people who have so wholeheartedly adopted Dr. Hay's methods. We also sympathize with the cook in a Hay diet household, as portrayed in a recent issue of the *New Yorker.*

The Newer Conception of Nutrition. Beverly Hills, Calif.; Nutritions, Inc., 1934, pp. 45.

This book, carrying a foreword by a Mr. Sims, is an addition to the growing list of

crudely prepared, chocolate-coated scientific literature which nicely prepares one for the use of Doctor Whoosit's dietary cure-all plan, or for swallowing his concentrated vitamin and mineral products.

Man's Natural Food. By Sydney M. Whitaker. Manchester, England: The Vegetarian Society, pp. 28.

This presents the usual arguments in favor of a vegetarian diet.

A Diabetic Manual. By Elliott P. Joslin, M.D. Philadelphia: Lea & Febiger.

An error was made in quoting the price of this book under this section of the May JOURNAL. The price is $2.00 a copy, instead of $1.75 as stated.

CURRENT LITERATURE

KATHLEEN M. LEWIS

American Journal Diseases of Children

Vol. 47, April, 1934

* Selection of malnourished school children. R. Franzen.—p. 789.

Vol. 47, May, 1934

* Growth and basal metabolism: I. Basal metabolism of preschool children. I. Nakagawa.—p. 963.
* Effect of varying sugar intake on nitrogen, calcium, and phosphorus retention of children. R. B. Hubbell and M. Koehne.—p. 988.

SELECTION OF MALNOURISHED SCHOOL CHILDREN. There is a definite need for a practical economical measure for detecting cases of malnutrition. When a child is markedly below his skeletal peers in weight, amount of muscle and amount of subcutaneous tissue, he probably needs medical attention. The A C H index appears to be the best extensive measure for the selection of malnourished children because it takes into consideration the weight, musculature and subcutaneous tissue.

BASAL METABOLISM OF PRESCHOOL CHILDREN. Studies on thirty-one preschool children show that the basal heat production per twenty-four hours increases with age, as do weight, height, sitting height, chest girth and other physical measurements. The basal heat production per unit of body weight and surface area decreases with age, as do the pulse rate and the respiratory rate. There is a slight difference in heat production between boys and girls, but the percentage of difference is not so great as that between the two sexes in adult life.

EFFECT OF VARYING SUGAR INTAKE ON NITROGEN, CALCIUM AND PHOSPHORUS RETENTION OF CHILDREN. The average nitrogen retention with a diet low in sugar during twenty-three seven-day periods was 0.026 gm. per kilogram per day while for calcium and phosphorus the corresponding values indicated a retention of 0.005 and 0.007 gm. No change was noted when the addition of sugar increased the caloric intake 6 per cent, but when it was raised to from 16 to 18 per cent, there was an increased retention of nitrogen and phosphorus. The retention of calcium decreased in five of the seven cases.

American Journal of Nursing

Vol. 34, April, 1934

Epilepsy, or the convulsive disorders. D. B. Peeler.—p. 311.
* The ketogenic diet. A. L. Mayer.—p. 321.

THE KETOGENIC DIET. The effects of a ketogenic diet are discussed. Sample menus, recipes and a method for calculating ketogenic diets are presented in a clear and concise fashion.

American Journal of Physiology

Vol. 108, April, 1934

The effect of exercise on the acetone bodies in the blood of man on low carbohydrate diet. C. L. Gemmill.—p. 55.
The effect of inorganic iron with and without ultraviolet radiation upon the prevention and cure of nutritional anemia. E. J. Andes and H. H. Beard.—p. 91.

Vol. 108, May, 1934

Hemoglobin production factors in the anemic horse liver. G. H. Whipple and F. S. Robscheit-Robbins.—p. 270.
* Hemoglobin production factors in normal livers of domestic animals. F. S. Robscheit-Robbins and G. H. Whipple.—p. 279.
The effect of sleep on human basal metabolism, with particular reference to South Indian women. E. D. Mason and F. G. Benedict.—p. 377.

HEMOGLOBIN PRODUCTION FACTORS IN NORMAL LIVERS OF DOMESTIC ANIMALS. Experiments on the livers of various animals show that horse liver has a higher content of hemoglobin production factors than either beef or pig liver. Reindeer and rabbit livers are less potent than pork liver for hemoglobin production.

American Journal of Public Health

Vol. 24, May, 1934

Studies on acidolphilus milk. C. N. Stark, R. Gordon, J. C. Mauer, L. R. Curtis and J. H. Schubert.—p. 470.

* Microbiological examination of fresh and frozen fruits and vegetables. F. W. Tanner.—p. 485.
The detection among food handlers in Connecticut. D. E. West, E. K. Borman and F. L. Mickle.—p. 493.

MICROBIOLOGICAL EXAMINATION OF FRESH AND FROZEN FRUITS AND VEGETABLES. Epidemics of communicable diseases have been traced to infected fresh vegetables. Since washing does not remove all organisms, it is essential to know something of the conditions under which such foods are raised. Since frozen foods do not receive treatment which will free them of microorganisms, it is necessary to give more attention to raw materials and conditions under which they are prepared than is the case with certain other preserved foods.

Annals of Internal Medicine

Vol. 7, May, 1934

* Hematological response of Addisonian pernicious anemia to brewer's yeast. H. K. Russell.—p. 1398.

HEMATOLOGICAL RESPONSE OF ADDISONIAN PERNICIOUS ANEMIA TO BREWER'S YEAST. Four cases of Addisonian pernicious anemia are reported in which a reticulocyte response followed the daily administration of six drams of brewer's yeast.

Archives of Internal Medicine

Vol. 53, April, 1934

* Constancy of iron in the blood plasma and urine in health and in anemia. A. Marlow and F. H. L. Taylor.—p. 551.

Vol. 53, May, 1934

* Determinations of enzymes on autopsy specimens from cases of pernicious anemia and pellagra. O. M. Helmer, P. J. Fouts and L. G. Zerfas.—p. 675.
Effect of toxemia on tolerance for dextrose and on the action of insulin. J. S. Sweeney, N. Barshop and L. C. LoBello.—p. 689.
Blood cholesterol and thyroid disease. L. M. Hurxthal.—p. 762.

CONSTANCY OF IRON IN THE BLOOD PLASMA AND URINE IN HEALTH AND IN ANEMIA. The iron content of the blood plasma of normal persons varies between 0.4 and 0.7 mg. per hundred cubic centimeters, while that of the urine ranges from 0.03 to 0.8 mg. in twenty-four hours. Values for patients with hypochromic anemia and pernicious anemia were well within these limits.

DETERMINATIONS OF ENZYMES ON AUTOPSY SPECIMENS FROM CASES OF PERNICIOUS ANEMIA AND PELLAGRA. The gastric mucosa of three patients with pernicious anemia contained no pepsin or rennin. Some pepsin and rennin was present in the gastric mucosa of pellagrins. The pancreatic tissue from the persons with pernicious anemia and pellagra contained normal amounts of tryptic, amyloptic, and lipolytic enzymes.

Hospital Management

Vol. 37, April 15, 1934

Better methods possible in many hospital kitchens. A. M. Bowers.—p. 46.
Features of food service of Kings County Hospital. M. W. Northrop.—p. 49.
Dietitian in small hospital is whole food service department. J. M. Candlish.—p. 52.
Some food economies we like. L. Johnson.—p. 53.

Vol. 37, May 15, 1934

Central food service after nine years. M. R. Harris.—p. 46.
Food service routine in private tuberculosis hospital. C. E. Shepard.—p. 50.

Journal of the American Medical Association

Vol. 102, April 7, 1934

Creatine metabolism in children with hypothyroidism. H. G. Poncher, M. B. Visscher and H. Woodward.—p. 1132.
Clinical manifestations of high and low plasma magnesium. A. D. Hirschfelder.—p. 1138.
* Some factors in wound healing. Editorial.—p. 1157.
* Species differences in organotherapy for pernicious anemia. Current Comment.—p. 1158.

Vol. 102, April 14, 1934

* Body build and metabolism. Editorial.—p. 1228.
The humoral theory of nervous function. Editorial.—p. 1229.
* The bactericidal action of ketonic urine. Current Comment.—p. 1231.

Vol. 102, April 21, 1934

Hyperparathyroidism. F. Albright, J. C. Aub and W. Bauer.—p. 1276.
The longevity of the erythrocyte. Editorial.—p. 1304.

Vol. 102, April 28, 1934

* A specific metabolic function of the thyroid. Editorial.—p. 1400.
Creatinuria and physical fitness. Editorial.—p. 1401.
Micro-organisms, carotene and vitamin A. Current Comment.—p. 1402.

Vol. 102, May 5, 1934

Cholesterol in the organism. Editorial.—p. 1501.

Vol. 102, May 12, 1934

Secretion of pancreatic juice. Current Comment.—p. 1611.

Vol. 102, May 19, 1934

Nervous stimulation to lactation. Editorial.—p. 1683.
The lipids of epithelial tissue. Current Comment.—p. 1684.

Vol. 102, May 26, 1934

* Hyperparathyroidism: A chapter in successful laboratory research. Editorial.—p. 1764.
The inorganic structure of bone. Current Comment.—p. 1766.

SOME FACTORS IN WOUND HEALING. It has been frequently observed that the wounds of undernourished patients, particularly those of children, heal slowly and become infected. The lack of any essential ingredient of the diet is likely to disturb the normal growth of an organism. In many respects processes of wound healing are comparable to those of growth.

SPECIES DIFFERENCES IN ORGANOTHERAPY FOR PERNICIOUS ANEMIA. The liver tissues of the cow, horse and hog, as well as desiccated whole stomach of the hog, contain something which takes an important part in hematopoiesis when given to patients with pernicious anemia. This curative property does not reside in the liver and stomach tissues of the dog.

BODY BUILD AND METABOLISM. Constitutional influences on basal metabolism may be of four kinds: those hereditary factors which affect body size and proportion, those which affect nervous organization, those which produce a tendency to leanness or fatness, aside from the endocrine functions, and the endocrine factors themselves.

THE BACTERICIDAL ACTION OF KETONIC URINE. The ketogenic diet has recently been inaugurated to control the objectionable colon bacillus found in the urine during pyelitis and other urinary infections. The principal factor inhibiting the growth of bacteria in the urine is *l-Beta*-hydroxybutyric acid which is formed when a ketogenic diet is given.

A SPECIFIC METABOLIC FUNCTION OF THE THYROID. It is suggested that the thyroid gland probably plays a rôle in purine metabolism.

HYPERPARATHYROIDISM: A CHAPTER IN SUCCESSFUL LABORATORY RESEARCH. Hyperparathyroidism causes a demineralization of the bones which may be prevented by a dietary regimen including calcium and phosphorus in abundance. Unfortunately, this treatment may need to be avoided because of the possibility of renal damage.

Journal of Biological Chemistry

Vol. 105, April, 1934

The amount of water stored with glycogen in the liver. E. M. MacKay and H. C. Bergman.—p. 59.
* The influence of fluorine ingestion upon the nutritional qualities of milk. P. H. Phillips, E. B. Hart and G. Bohstedt.—p. 123.
* The influence of breed and diet of cows on the carotene and vitamin A content of butter. C. A. Baumann, H. Steenbock, W. M. Beeson and I. W. Rupel.—p. 167.

Vol. 105, May, 1934

The determination of carotene in butter fat. H. M. Barnett.—p. 259.
* Studies in the nutritional anemia of the rat. F. C. Bing, E. M. Saurwein and V. C. Myers.—p. 343.
The cholesterol content and the antirachitic activation of milk constituents. S. Ansbacher and G. C. Supplee.—p. 391.

THE INFLUENCE OF FLUORINE INGESTION UPON THE NUTRITIONAL QUALITIES OF MILK. Fluorine-bearing mineral supplements were used for feeding dairy cattle. This study was made to determine whether or not the nutritional qualities of milk were influenced by different levels of fluorine intake. It was found that the fluorine content of milk is comparatively difficult to influence by dietary means.

THE INFLUENCE OF BREED AND DIET OF COWS ON THE CAROTENE AND VITAMIN A CONTENT OF BUTTER. Determinations of the carotene and vitamin A content of butter fat from cows of various breeds on high and low carotene diets show marked differences. When the carotene intake of the cow was increased, there was an increase in both the carotene and vitamin A content of the butter fat.

STUDIES ON THE NUTRITIONAL ANEMIA OF THE RAT. Rats were made anemic by restriction to milk. The oral administration of pure ferric chloride resulted in appreciable hemoglobin production. The addition of copper sulphate to the milk and iron resulted in complete restoration of the hemoglobin to the normal level.

Journal of Nutrition

Vol. 7, April, 1934

* The effect of heat upon the biological value of meat protein. A. F. Morgan and G. E. Kern.—p. 367.
* The influence of roughage on protein digestibility. W. H. Adolph and M. Wu.—p. 381.
* The biological availability of soybean carbohydrate. W. H. Adolph and H. Kao.—p. 395.
Neurological disturbances in rats reared on diets deficient in vitamin A. S. B. D. Aberle.—p. 445.
* Relation between the physical character of food and dental caries in albino rats. C. A. Lilly and L. Wiley.—p. 463.
Analysis of meats. V. A. Toscani, V. R. Rupp and W. S. McClellan.—p. 473.

Vol. 7, May, 1934

Possible sources of calcium and phosphorus in the Chinese diet. P. Hoh, J. Williams and C. Pease.—p. 535.
* Hyperthyroidism and nutrition. 1. Vitamin B and thyroxin. B. Sure and M. E. Smith.—p. 547.
The storage of vitamin A in the liver of the rat. A. McCoord and E. Luce-Clausen.—p. 557.

THE EFFECT OF HEAT UPON THE BIOLOGICAL VALUE OF MEAT PROTEIN. There appears to be a heat injury to meat protein which increases in severity with the length of exposure and the height of the temperature reached. Rats grew best on a raw beef diet.

THE INFLUENCE OF ROUGHAGE ON PROTEIN DIGESTIBILITY. Lowered values for protein digestibility on a given diet result only when the food material passes through the alimentary tract with unusual rapidity.

THE BIOLOGICAL AVAILABILITY OF SOY-BEAN CARBOHYDRATE. An experimental diet containing soybean carbohydrate, with positive and negative controls, was used with rats to measure the formation of liver glycogen, extra sugar in phlorizinized animals, and the respiratory quotient. In vitro examination of digestibility as well as these in vivo experiments indicate that about 40 per cent of the soybean carbohydrate is utilized by the animal body.

RELATION BETWEEN THE PHYSICAL CHARACTER OF FOOD AND DENTAL CARIES IN ALBINO RATS. Diets adequate for growth and reproduction according to accepted standards, containing coarse cornmeal, produced dental caries in 100 per cent of albino rats in 125 days. The incidence of caries was related to the physical form of the food and not to the calcium or phosphorus values of the diet. If the diet was made soft by cooking or grinding, no caries developed. Vitamin D did not prevent the occurrence of caries.

HYPERTHROIDISM AND NUTRITION. In experimental hyperthyroidism protection can be afforded by a highly concentrated vitamin B preparation. It is suggested that oral administrations of potent standardized vitamin B concentrate may be indicated in toxic goiter, particularly the non-operative type.

Modern Hospital

Vol. 42, April, 1934

Modernization cuts dietary costs and improves service. D. Milavetz.—p. 114.
The small hospital dietitian—a specialist in many lines. L. Clark.—p. 120.
April dinner menus for the general hospital patient. H. B. Anderson.—p. 124.

Vol. 42, May, 1934

Special diets—methods of ordering, transporting and serving them. J. C. Doane.—p. 83.
Food service systems in a large metropolitan hospital. N. Ross.—p. 104.
How one smaller hospital operates its Dietary Department. F. B. Bowen.—p. 110.
May dinner menus for the general hospital patient. L. F. Cooper and E. Cole.—p. 116.

ASSOCIATION PROGRESS

PRESIDENT'S MESSAGE

As you read this there remains nearly a third of the year before our annual meeting at Washington, D. C., in October. The Association has several major activities in which individual member support can be of inestimable value. Your wholehearted support of these will in turn redound to your own professional growth and interest in your Association.

Membership Campaign. First and foremost we ask your active participation in the campaign for new members. Read Effie May Winger's report facing the inside back cover which lists the names of the state chairmen in your own state. If your state is missing, Miss Winger will be glad to have you write asking how you can help.

The American Dietetic Association is an organization through which college graduates with a major in foods and nutrition or institution management are united for the conservation and expansion of opportunities open in the profession, the elevation of its standards, and the stimulation and improvement of the professional qualifications of the individual member. What then of the young dietitian? Membership in the Association brings her a desirable professional status more quickly and with less expenditure of time and money than any other course, because of the strict adherence to standards for admission to active membership. Can she therefore afford to deny herself the rights, privileges and prestige which membership brings? She needs the support of her professional association at the beginning of her career more, probably, than at any other time.

Every dietitian realizes that ultimately her own professional and material welfare is intimately bound up with that of the American Dietetic Association. For in a profession, especially, without organization there is no cohesion, no opportunity for mutual consideration and subsequent combined action in matters affecting the profession as a whole, no machinery for promoting technical development and disseminating its results; in fact, without organization there is complete absence of combined action looking to the advance of a profession and the growth of individual members. The work of the national organization cannot be curtailed or its resources impaired without ultimate detriment to the professional and material well-being of each of its members.

Placement Bureau. Second, and in line with the Membership Campaign we ask your eager, loyal interest in behalf of the Placement Bureau. The decisions of the Executive Committee with respect to strengthening the organization of the Placement Bureau and Journal Boards were briefly outlined in the March JOURNAL, and plans made which permit your active support.

The first step to strengthen both boards was the arranging of geographic divisions as shown on the accompanying map, so that appointment to either Board may now assure representation from each geographic division at all times. For example, the retiring member of the Placement Bureau Board for 1933 came from "Division Ia—New England;" therefore the new appointment was made from this same division.

In the setting up of geographic divisions for the Placement Bureau Board in the light of the proposed extensive and specialized functions of its members, the need for limiting the size of the total territory for each member was at once self-evident. The Executive Committee therefore granted your President the privilege of appointing additional committee chairmen to be responsible for the geographic divisions not covered by the present six members of this board. The present members represent the following areas:

	Geographic Division	*Term Expires*
Helen E. Gilson: Ib—Middle Atlantic		1934
Katherine Mitchell: III—East North Central		1935
Helen Anderson: VIb—South Pacific		1936
Fairfax Proudfit: II—South Atlantic and East South Central		1937
Kathleen Burns: VIc—Canada		1938
Octavia Hall Smillie: Ia—New England		1939

The additional committee chairmen necessary to cover the four geographic divisions not included in this list will be appointed this year as chairmen of standing committees, because at present the Constitution limits the size of the Placement Bureau Board to six members. Hereafter each member will serve as chairman of the placement committee representing her geographic division. This placement committee consists of her personal appointees, one from each state within her area.

The duties and the promotional work of the members of the placement committee in each division will be determined by the chairman. In general it is hoped that each Placement Bureau Board member will make an effort each year to address at least one meeting of each of the state dietetic associations comprising her division.

Each committee member will in turn so organize her work in her own state as to know intimately the situation and working conditions in each hospital, to know personally each hospital superintendent, whenever possible, and be able to describe to him the services our Association is prepared to offer when he is in need of a new dietitian. These plans will also apply, as organization procedure is perfected, to openings in college and private school dormitories, college cafeterias, school lunch rooms, and restaurants.

Journal Support. The major activities concerning the JOURNAL continue a challenge to our members. These activities deal with the JOURNAL sections of Current Comment, Current Literature and News Notes. There is a growing conviction in the minds of the four national chairmen of the Journal Current Comment project that it can be simplified and vitalized by having one of each of the six geographic divisions of the Journal

Board assume responsibility for the contents of the Current Comment section for each successive number of the JOURNAL.

Watch your September JOURNAL for the perfecting of this plan!

NEWS CONCERNING APPROVED COURSES

The dietary staff of the Latter Day Saints' Hospital has affiliated with the Neighborhood House and are actively engaged in assisting with family budgets and are making family case calls.

Winifred Howard Erickson, director of dietetics of Ancker Hospital, St. Paul, writes that plans for affiliating with the St. Paul Baby Welfare are completed and that student dietitians will spend at least a month there. A clipping from the *St. Paul Sunday Pioneer Press* gives front page space to an account of this work. Especial attention is given to well babies, and the motto of the welfare group is "Keep well babies well." In addition to its educational program, the Association provides free cod liver oil to families that cannot afford to buy it, and approximately 500 gallons were given away in 1933. A fund is provided by the Community Chest for this purpose. Mrs. Erickson also states that she has assisted dietitians employed by the CWA to be placed temporarily in the St. Paul hospitals. These dietitians are given maintenance and a small allowance and have the opportunity to do relief work during vacation time.

Millie E. Kalsem, director of the dietary department, Cook County Hospital, Chicago, writes that the affiliation with Wesley Memorial Hospital has worked out very satisfactorily. Miss Kalsem and Miss Tuft have arranged to have the students meet socially in order that they might become better acquainted and develop an interest in both hospitals. At these meetings talks are given in order to establish a better attitude on the part of these students and to effect a harmonious coöperation between the two hospitals. Misses Tuft, Floore and Mitchell have held conferences and discussed classes in clinical dietetics to be given by staff dietitians. It was felt that it might be an advantage to have a larger group and group classes have therefore been scheduled. Field trips have also been arranged with the entire group. The affiliation with the Infant Welfare Society has progressed favorably. The food clinic at the Cook County Hospital is developing slowly; it is hoped to have definite space for office and food clinic soon. It is planned to lengthen the training course for the student dietitians here to twelve months.

Rhoda Tyler, supervising dietitian of Grasslands Hospital, Valhalla, N. Y., writes of her activities during the past year. In connection with the course affiliation with the Public Health Nursing Association of Tarrytown, cooking classes were formed for the clients receiving relief and the students all have a month of service teaching in the classes and doing home visiting with individual instruction in the homes. Miss Tyler reports various interesting social activities among the student dietitians, in coöperation with the nurses and other hospital personnel. Recently Miss Jones of the General Baking Company gave an illustrated lecture on vitamins to the student body, nurses, and dietitians.

The Cincinnati course for student dietitians is now affiliated with the Babies' Milk Fund Association of that city.

The name of the Highland Hospital, Oakland, California, has been changed to Alameda Hospital.

Helen C. Burns is the dietitian in charge of the course for student dietitians which re-opened July 1 at the Walter Reed General Hospital, Washington, D. C.

The executive committee of the New Jersey State Dietetic Association presented to the nutrition department of the Hackensack Hospital a check for $25.00 with which to buy books for the reference library for the student dietitians. The following books have been purchased: Treatment in General Practice, Beckman; Text-Book of Medicine, Cecil; Human Nature and Management, Tead; Edgewater Beach Salad Book, Shircliffe.

The New York Nutritionists will sponsor,

twice each year, as field work in nutrition for all students in approved courses in Greater New York, a course of seven lectures. The series will be followed by observation and visits to a variety of public health classes, clinics, etc.

The first lecture, "General Resources of the Community" will cover public and private agencies, health organizations, facilities for recreation, nutrition service and other agencies of similar nature.

"An Introduction to Family Case Work" will be the second topic, followed by "The Public Health Worker, Her Aims and Methods of Promoting Health" as the subject for the third lecture.

"Economic Problems of the Family" will include standards and costs of living, wages, family budgets, and food allowances. This topic will be followed by "Feeding the Family at Low Cost" to include a discussion of essentials and economies, and low cost food orders.

Under the heading of "The Patient a Member of a Family Group," the normal diet as a basis for special needs will be taken up, also a consideration of economic status, household equipment, time schedule of the mother, and questions of nationality. The subject of the last lecture will be "Problems That May Be Encountered," including language difficulties, personal prejudices, inadequate training in home making, mental equipment, child training and other problems.

The speakers in this series will be women well known for their work in the field of social service.

OREGON NUTRITION COUNCIL

The organization plan of this group, made up of members of the American Dietetic Association as well as other professional men and women with a common interest, should be stimulating to many local and state affiliated dietetic groups.

The Oregon State Nutrition Council was organized about ten years ago by Mrs. Jessamine Williams, Director of Foods and Nutrition at the Oregon State College, and Dr. Estella Ford Warner, at that time medical examiner for the child health demonstration. The membership now numbers over thirty and is composed of representatives of various groups engaged in nutritional work and allied fields. All of the public departments, private agencies, institutions and associations interested in nutrition in any way are affiliated with the Council.

The program of the Council is the development of interest in nutrition and its place in the general social plan, by means of programs of mutual interest to various groups concerned, and through meetings. Meetings are held quarterly. One meeting each year is devoted to discussion of trends and results in scientific research, and is headed by Dr. Ira Manville. The summer meeting is usually held at the Oregon State College, in connection with the summer session, with an address by the visiting professor in nutrition. The Annual Institute of the Council was held in February. At the May meeting Dr. Manville was in charge of the research program, directing the presentation of material. The Council has prepared a printed book list, with comments on the various books recommended.

A MODEL FOR DELEGATES

With the 1934 national meeting just ahead of us, it might be helpful for delegates from state associations to keep in mind the plan of reporting the convention so well worked out by Mary Estelle Kribs, dietitian of Hackensack Hospital, Hackensack, N. J. For the post-convention meeting of the New Jersey Dietetic Association Miss Kribs arranged a scrapbook of all the informative material collected at the national meeting. These data included programs of the meetings, lists of topics from the affiliation luncheons, *A. D. A. Lines*, the mimeographed "Trips" and "Where to Eat and What to See in Chicago," the professional education report, analysis of institution food consumption, report of community education section, dietary case study forms, as well as all the bibliographies distributed. Detailed reports of the affiliation luncheon and luncheon for heads of approved courses were read before the association, as being of particular topical interest.

The scrapbook contained copies of all the advertising material from the exhibitors' booths, arranged in logical and useful form. The catalogs of those publishers who had booths at the convention were included, as well as advertising pamphlets and books of recipes. One section was devoted to the equipment manufacturers.

The final touch which made Miss Kribs' record complete was the *Palmer House Magazine*, and illustrations of the Century of Progress and of Chicago. During the intermissions throughout the day many interested dietitians were observed examining and studying all of this material, making notes of where to procure certain items to fill personal and institutional needs.

JOURNAL CURRENT COMMENT

Cora Kelley Kusner has made the following appointments for the purpose of stimulating administrative articles for the Current Comment Section of the JOURNAL: Mable McLachlan, University of Michigan Hospital, Ann Arbor, Mich.; Alice Flint, Rhode Island Hospital, Rhode Island; Amy Colescott, City Hospital, Indianapolis, Ind.; Josephine Sutfin, Essex County Hospital, Cedar Grove, N. J.; Lydia Beck, Woodman Sanatorium, Woodman, Col.; Mrs. Alta Bolender Hirsch, Miami Valley Hospital, Dayton, Ohio; Clara G. Turner, State Teachers College, Harrisonburg, Va.; Evelyn Anderson, Passavant Hospital, Chicago, Ill.; Alma Bering, Sheppard Pratt Hospital, Towson, Md.; Reva Hinyan, California Hospital, 1414 S. Hope St.; Los Angeles, Calif.; Mrs. Edna B. Carl, Multnomah County Hospital, Portland, Ore.; Mary A. Foley, Kahler Corporation, Rochester, Minn.; Pauline Emerson, Bridgeport Hospital, Bridgeport, Conn.; Virginia Howard Ray, Albany Hospital, Albany, N. Y.

Mary Louise Bone has appointed the following to serve for the professional education interests: Mrs. Isadora Anshutz, Bloomingdale Hospital, White Plains, N. Y., Verna Ansorge, Methodist Hospital, Indianapolis, Ind.; Elizabeth Baldwin, Lindbergh Apartments, Portland, Ore.; Dr. Marion Bell, Temple University, Philadelphia, Pa.; Frances Floore, St. Luke's Hospital, Chicago, Ill.; Emaleen Graham, Department of Nutrition, Medical College of Virginia, Richmond, Va.; Rosella Hanfeld, Mercy Hospital, Denver, Col.; Mary Harrington, Harper Hospital, Detroit, Mich.; Ethel Heaberlin, Midway Hospital, St. Paul, Minn.; Marie L. Hines, University Hospitals, Cleveland, Ohio; Martha Monahan, Baltimore Dairy Council, Baltimore, Md.; Elizabeth Rupert, Hackensack Hospital, Hackensack, N. J.; Dorothy Simpson, New Haven Hospital, New Haven, Conn.; Mrs. Dorothea Turner, 42 Adelphi Avenue, Providence, R. I.; and Rosina Vance, New England Deaconness Hospital, Boston, Mass.

The contributors to this month's Current Comment Project are as follows: Administration, Mrs. Alta Bolender Hirsch, director of dietetics, Miami Valley Hospital, Dayton, Ohio; Community Education, Margaret S. McCready, president, Ontario Dietetic Association; Diet Therapy, Kathryn Heitshu, Medical College of Virginia; and Professional Education, Madeleine M. Tobias, Columbus, Ohio.

INSTITUTIONAL COOKING

An editorial on the above subject, appearing in the *New York Times* for May 20, 1934, would appear to have been written by someone who had had a course of instruction in the subject, so clearly is an understanding shown of the difficulties in the situation. The editorial writer goes straight to the heart of the matter when he states the chief difficulty is the lack of money and that budget superintendents and boards of trustees for hospitals and residence halls make every effort to pare kitchen expenses to the bone. He emphasizes the fact that the dietitian cannot be blamed for the flatness that marks mass production of food, especially with a poorly paid staff of kitchen employees; the blame lies rather at the doors of superintendents and boards of trustees "accustomed as they are to judging the condition of any enterprise chiefly by its balance sheet."

KNOWING OUR NOTABLES

One of the most industrious members of our Association, who has probably done

more per kilo of body weight for the national, and certain local and state groups, than anyone else, is Fairfax Proudfit. We are indebted to Miss Proudfit for her interest in submitting the papers of Miss Mathews and Miss Smith, which appeared in the JOURNALS for May and this month. Among her many interests Miss Proudfit is preparing the fifth edition of her successful text book for nurses.

The loyal interest of another section of the country is illustrated by the activity of Dorothy M. Proud of Cleveland, who submitted to the JOURNAL the paper appearing in this issue by Mr. J. W. Vanden Bosch.

Margaret S. McCready, one of the contributors to this issue's current comment, is the author of "Analysis of Weekly Relief Food Orders in a Southern Ontario City," appearing in the *Canadian Public Health Journal* for February, 1934. Miss McCready is a member of the committee appointed by the Ontario Medical Association to formulate relief diets.

Wilda Hockenberry Bradshaw is the author of an interesting article, "Experiences of a Dietitian in South China," which appeared in a recent issue of the *Trained Nurse and Hospital Review*.

A recent letter from Ruth Dodge, chief dietitian of the U. S. Veterans Hospital, American Lake, Washington, and sister-in-law of our national President, contains the following cheering statement concerning this Section "I think your new section, 'Association Progress' in the JOURNAL is a fine idea and that it should prove of general interest to all members and of particular interest to those of us who have to depend on the JOURNAL almost entirely for information about the American Dietetic Association."

GEOGRAPHIC DIVISIONS FOR JOURNAL AND PLACEMENT BUREAU BOARDS OF AMERICAN DIETETIC ASSOCIATION, 1934

Journal Board Division	*Geographic Division*	*Placement Bureau Board Division*
I	North Atlantic	
	Canada	
	New England	Ia
	Middle Atlantic	Ib
II	South Atlantic East South Central	II
III	East North Central	III
IV	West North Central	IVa
	West South Central	IVb
V	Northern Rocky Mountains	Va
	Southern Rocky Mountains	Vb
VI	North Pacific	VIa
	South Pacific	VIb
	Canada	VIc

NEWS NOTES

The Washington Meeting, American Dietetic Association, October 13 to 20. Many unique and interesting features have been planned for this year's program. Ruth Atwater, second vice-president of the American Dietetic Association, and president of the District of Columbia Dietetic Association, will preside at the Welcoming Luncheon on Monday, when Genevieve Forbes Herrick, special writer for the *Chicago Tribune* and president of the Women's Press Club of Washington, D. C., will speak. Sybil Holmes, assistant attorney general of Massachusetts, will speak briefly at the annual business meeting on Monday.

The Program Committee has thoughtfully arranged sufficient time for each section so that there will be a half-day for a general section meeting and another half-day for round table discussions. Luncheons have been arranged for interested groups, one of these being for heads of home economics departments and heads of approved training courses. Tuesday's dinner will be for the heads of departments giving approved training courses, and Mary de Garmo Bryan will preside. Lillian Storms will preside at the exhibitors' luncheon on Wednesday. The interesting topics of illumination, air conditioning and business administration will be discussed at the general session on Thursday. The publicity dinner, with Esther Kimmel presiding, will follow Thursday evening.

Dr. Marie Mount, chairman of the Program Committee, will be glad to make arrangements for a breakfast, luncheon or dinner for any group interested in meeting together. Dinners can be arranged for any night except that of the annual banquet, and luncheons for any day except Monday. If special arrangements are to be made, it will be necessary to write immediately to Dr. Marie Mount, University of Maryland, College Park, Md.

Mary Lindsley is giving a welcoming tea to the Association on Sunday, October 14, at the Dodge Hotel, when members will be able to meet women prominent in government work.

Adeline Wood, supervising dietitian, Mount Sinai Hospital, Fifth Avenue and 100th Street, New York City, has accepted appointment to the Exhibit Committee from New York City to replace the earlier appointment of Miss Whitfield who through illness was unable to assume this responsibility.

TENTATIVE PROGRAM OCTOBER 14–19

Saturday, October 13

10:00 a.m. Executive Committee Meeting. Quindara Oliver Dodge, President, presiding

8:00 p.m. Executive Committee Meeting. Quindara Oliver Dodge, President, presiding

Sunday, October 14

2:00 p.m. Journal Board Meeting, Mary P. Huddleson, editor, presiding

4:00–6:00 p.m. Tea—Dodge Hotel, Mary Lindsley, hostess, assisted by Maryland, Virginia and the District of Columbia Dietetic Associations

2:00–4:00 p.m. Registration

7:00–9:00 p.m. Registration

7:00–10:00 p.m. Placement Bureau Board Meeting, Helen Gilson, presiding

Monday, October 15

9:00 a.m. Registration

10:30–11:00 a.m. General Session, Quindara Oliver Dodge, President, presiding. Kate Daum, speaker, "American Dietetic Association in Relief Work," other speakers to be announced

12:30 p.m. Welcoming Luncheon, Ruth Atwater, Chairman, presiding
Speaker, Genevieve Forbes Herrick, special writer for Chicago Tribune

2:30 p.m. Annual Business Meeting, Quindara Oliver Dodge, President, presiding. Speaker, Sybil Holmes, Assistant Attorney General, Massachusetts

4:00 p.m. Tea in Exhibit Room

7:00 p.m. Affiliation Dinner, Laura Comstock, Affiliation Chairman, presiding (Other dinners to be arranged)

Tuesday, October 16

9:00 a.m. Professional Education Section, Mary Harrington, Chairman, presiding
12:30 p.m. Luncheon for heads of home economics departments in colleges, and heads of departments giving approved training courses for dietitians
2:15 p.m. Administration Section, Faith McAuley, Chairman, presiding
4:00 p.m. Tea in Exhibit Room
7:00 p.m. Dinner for heads of departments giving approved training courses, Mary de Garmo Bryan, presiding
(Other dinners to be arranged)

Wednesday, October 17

9:00 a.m. Community Education Section, Mary I. Barber, Chairman, presiding
11:00 a.m. Administration Section Round Table
12:30 p.m. Exhibitors Luncheon, Lillian B. Storms, Chairman, presiding
2:15 p.m. Diet Therapy Section, Lute Troutt, Chairman, presiding
4:00 p.m. Tea in Exhibit Room
7:00 p.m. Annual Banquet, Quindara Oliver Dodge, President, presiding

Thursday, October 18

9:00 a.m. Professional Education Section—Round Table
10:00 a.m. Diet Therapy Section—Round Table
11:00 a.m. Community Education Section—Round Table

Thursday, October 18

12:30 p.m. Luncheons (to be arranged)
2:15 p.m. General Session, Quindara Oliver Dodge, President, presiding
Topics: "Illumination," "Air Conditioning," "Business Administration"
Speakers to be announced
4:00 p.m. Tea in Exhibit Room
7:00 p.m. Publicity Dinner, Esther Kimmel, Chairman, presiding
Speaker—Gertrude Lane, Editor, Woman's Home Companion
8:30 p.m. Administration Council Committee Meeting—Composed of all past Presidents

Friday, October 19

Trips

Saturday, October 20

Visit to Johns Hopkins Hospital, Baltimore, Maryland

American Home Economics Association. The twenty-seventh annual meeting will be held in New York City, June 25 to 29, 1934, with the Hotel Pennsylvania as headquarters.

The central theme, "The Consumer in the New Economic Order," will be discussed by representatives of industry, business, government agencies, and consumer groups as well as by members of the Association. Family relationships, family economics, the house and its management, food and nutrition, textiles and clothing are special divisions of home economics to which group meetings will be devoted. There will also be opportunity for members to discuss home economics progress and plans in such different occupations as teaching, extension service, business, institution administration, homemaking, research, and social service. The chairman of local arrangements for the meeting is Edith Barber, 36 West 9th Street, New York City.

The Woman's College of the University of North Carolina at Greensboro. Dr. Kate Daum, director of nutrition in the University Hospitals of Iowa University taught two courses, "Diet in Disease" and "Seminar in Nutrition" during the first three weeks, June 13 to July 4, of the summer session. The courses were continued by Dr. Ada Field, well known nutritionist of the South. Other interesting graduate courses were offered including "Art Appreciation," "Child Development," and "Social and Economic Problems of the Family."

Department of Hotel Administration, Cornell University, Ithaca, New York. A two-weeks' summer course in hospital operation planned especially for hospital officials and staffs has been announced by Cornell University at Ithaca, New York. A widely-known and well-trained practical hospital

man will be in charge. The course opens July 2 and runs for two weeks. The mornings will be given over to lectures, the afternoons to round-table discussions and reports by members of the class on problems and projects worked out in their respective institutions.

The American Institute held its Medal Award Meeting on May 3. Dr. Oscar Riddle, of the Research Staff of Carnegie Institution of Washington, was awarded a gold medal in recognition of his achievements in endocrine research. Following the presentation by Dr. Allen Winter Rowe, Dr. Riddle gave an address on "Among the Endocrines." In recognition of his achievements in nutrition research, Dr. E. V. McCollum, head of the Biochemistry Department, School of Hygiene and Public Health, Johns Hopkins University, was presented a gold medal by Dr. H. C. Sherman. Dr. McCollum then spoke on "What Next in Nutrition?"

M. Faith McAuley, chairman of the Administration Section, has been appointed administrative dietitian for the State of Illinois with the Illinois Emergency Relief Commission and the Service Bureau for Transients.

The International Hospital Association announce a post-graduate course to be held in Switzerland during August. Preliminary meetings and lectures will be held August 15 to 18; the second post-graduate course will be held August 19 to 23; and a study trip to the Canton of Grisons, August 23 to 28. Interesting illustrated programs for these sessions are available, in which no detail has been overlooked, all meals being listed in three languages, from "petit lunch froid" through "Lunch im Restaurant Weissfluhjoch," to dinner at the respective hotels. The program will be in German, French and English. Further information may be secured from the Secretary's Office, Obergrundstrasse 13, Luzern.

Therapeutic Abstracts, Volume I, Number 1, published by The William S. Merrell Company, Mary Peyton Ballard, Editor, presents a résumé of abstracts of recent literature on alpha-dinitrophenol and dinitro-o-cresol, as stimulators of metabolism, arranged chronologically.

Mail sent to the following members has been returned, unclaimed: Mary M. Morhart, Mrs. Theresa Lemmon Grossdan, Carolyn H. Martin, Florence Sperry, Mrs. Sulvia B. Lystod, Mrs. Marion G. MacLean, Mrs. Esther McCormick, Massa Lambertson, Helen Noyes, Myrtle Larson, Blanche H. Heninger, Janette M. Baird, Winifred Yates, Dorothy M. Froats, Emily Scott, Helen Paynter, Joan Rock, Mrs. Reva G. Stuart Ward, Mabel Malcolmson, Ruth E. Williams, Mrs. Rae Snow Gilmore, Lala J. Titus, Julia R. Hintzman, Elizabeth G. Clarke, Mrs. Kenneth F. Wilson, Doreen Aldwell, Leida Adamberg, Rosamond M. Lynch, and Marjory S. De Forest.

California Dietetic Association. Bay Section. The April meeting was held at the Dorchester Hotel, 1482 Sutter Street, San Francisco. Thirty-two were present. Lucille Waite, chairman, gave a short summary of the Western Hospital Association held in Sacramento. In summarizing Dr. McEachern's talk on dietetics, Mrs. Waite recalled the five obligations of a hospital dietitian as given by him. Dr. McEachern says these are: (1) to the hospital economically, as the dietitian spends 25–30 per cent of the money for food and food service; (2) to the patients, so that the patient may be satisfied; (3) to the help in the hospital, to see that they are properly fed and satisfied; (4) to the community, in health education when possible; and (5) to herself, to keep herself growing in her professional studies and attitude. Mrs. Waite also spoke of the talks given by Mr. Jensen, superintendent of Fairmont Hospital, on "The Value of a Cost Control System," and that of Dr. J. J. Frey, general sales manager, Golden State Company, on "How the Purveyor can help the Dietitian Buyer."

Mme. Stella Vaught, in whose music studio the meeting was held, rendered three very beautiful selections. A general discussion of individual problems was found valuable to

many. At the conclusion of the meeting delicious refreshments, furnished by Borden Ice Cream Company and the San Francisco Biscuit Company, were served.

Los Angeles Section. The seventy-ninth meeting of the Los Angeles section was held April 2 at the new Los Angeles County General Hospital with an attendance of 59. The group found the conducted trip through the institution most interesting. It was the second to have this privilege and opportunity of seeing the hospital before the formal opening. Following the tour, members and guests enjoyed a dinner served by Mrs. Margaret Huddleston and her assistants. After dinner Mr. G. W. Olson, assistant superintendent of the hospital, gave an interesting talk on "Hospital Management and Equipment." A short business meeting followed.

With Elizabeth Hayward as chairman, a committee is making interesting plans for the tenth annual State convention to be held in Pasadena at the Huntington Hotel, August 31 and September 1.

Chicago Dietetic Association. Due to the kindness of the American Hospital Association, dietitians will be represented at the 1934 Century of Progress exposition in Chicago. Visiting dietitians will be welcomed at their exhibit, which is in the hospital association's booth. One successful bridge party has already been given at St. Luke's Hospital, with Miss Frith of Michael Reese Hospital in charge, in order to raise funds for this project. Other functions have been planned for future dates.

Several swimming parties held at the Medinah Athletic Club, and an all day outing at the Medinah Country Club, are helping the members, both old and new to become better acquainted socially.

These social functions have not taken the place of business meetings, as in April, Dr. Herbert Barker of Passavant Hospital, spoke on the "Relation of Diet to the Mineral Balance in Heart and Renal Disorders." The association met at the Furniture Mart in May, at which time representatives of silver and china companies talked about the selection and care of these articles. Before and after the meeting exhibitors of equipment, food and other products gave special demonstrations. Dr. Jacob Meyer, of Cook County Hospital, dealt with the "Newer Phases of the Treatment of Gastro-Intestinal Conditions," at the June meeting.

Souvenir books of tickets to the Century of Progress were sold to aid the Federated Council of Professional and Business Women of Chicago in their philanthropic projects. This was done instead of giving an annual bridge party.

There is a definite meeting place now for dietitians in the Hall of Science at the exposition.

Cincinnati Dietetic Association. The January meeting was especially enjoyed by the members of the association because Mrs. Stokes, director of the Babies' Milk Fund Association, explained the far-reaching activity of that branch of public welfare.

A joint meeting with the Cincinnati Home Economics Association was held in February in the Gwynne Building. Dr. Marietta Eichelberger, who is associated with the Evaporated Milk Association, gave a very interesting and valuable talk on "The New in Nutrition."

At the March meeting at the Cincinnati General Hospital, arrangements were discussed for the Ohio Dietetic Association which met jointly with the Tri-State Hospital Convention in Cincinnati on April 17, 18, and 19 at the Netherland Plaza.

The Connecticut Dietetic Association was delighted to have Mrs. Quindara Oliver Dodge as guest speaker at their Spring dinner meeting at the Faculty Club, New Haven, in April. There was an attendance of forty-three.

The District of Columbia Dietetic Association held its annual business meeting in April at Emergency Hospital with Ann Jones as hostess. It was unanimously voted that the same officers hold their respective offices and that the committees and the chairmen remain unchanged until November 1. This plan was adopted in order that plans for the national convention in October might be carried on by the same group.

Mrs. Evelyn S. Tobey of Columbia University was the guest of honor at a joint dinner meeting with the Home Economics Association held on May 3 at the Y. W. C. A. Mrs. Tobey gave a fascinating, demonstration talk on "What Clothes do to Us." It was interesting to see how many different costumes could be made out of one dress.

The annual June breakfast was held on June 3 at Pierce Mill Tea House with Mabel Ashenfelder as hostess. Pierce Mill Tea House is located in Washington's magnificent Rock Creek Park and a very delightful time and a delicious breakfast made a memorable meeting. The Association again extends a hearty welcome to the members of the American Dietetic Association and their friends to come to Washington the week of October 14.

Indiana Dietetic Association. The February and March meetings embraced topics of keen interest to those present. Dr. C. B. Bohner, specialist in allergic diseases, read a paper on "Food Allergy" and Dr. J. W. Ricketts discussed "Amoebic Dysentery" in relation to the epidemic following the Century of Progress Exposition in Chicago. He emphasized the rôle of the dietitian in the prevention of the spread of the disease during the ensuing years.

The April meeting has become a general, annual meeting and was held in the auditorium of L. S. Ayres and Company department store. Many instructors in nutrition, as well as dietitians were present. During the afternoon, Mrs. Eleanor B. Miller, home consultant of L. S. Ayres and Company, discussed "The Importance of Color in the Tray and Other Appointments for the Sick." A series of eight trays was set with various types of china and matching materials were used as backgrounds to illustrate the speaker's discussion. Mary I. Barber entertainingly talked on "Essential Training for the Dietitian in the Commerical Field." Miss Barber also outlined her committee work on community education for the American Dietetic Association. Following Miss Barber, Dr. Gordon W. Batman spoke on the topic, "A Doctor Looks at Diets." Tea was served from four to five p.m.

In the evening a dinner for members and guests was held in the Columbia Club. Lute Troutt, American Dietetic Association, Diet Therapy Section chairman, spoke briefly of the work of her committee. Other speakers included Frances Studebaker, DePauw University; Ida B. Wilhite, Butler University; and Alice B. Nelson, Indiana University. M. Faith McAuley, guest speaker of the evening, addressed the group on "Food Cost Control." Miss McAuley's address was so concrete and objective that the group as a whole indicated a vast amount of interest.

The association was most fortunate in having three national committee chairmen participate in its annual meeting. Margaret D. Marlowe is president of the organization and Gladys Hall Silkey was chairman of the program committee for the annual meeting.

The Iowa State Dietetic Association held its semi-annual meeting April 30 and May 1 with the Iowa Hospital Association at Hotel Chieftan, Council Bluffs, Iowa. Dorothy Anderson, president, welcomed the members of the Omaha Dietetic Association, and Vesta Davis of Creighton University responded.

Dr. Louis Moon and Dr. Carl Russum of Creighton University gave an illustrated lecture on "Amebiasis." Elizabeth Hintz, University Hospital, Iowa City, talked on "The Educational Function of the Dietary Department." Dr. Malcolm T. MacEachern, representing the American College of Surgeons, gave a talk on "The Responsibilities of the Dietitian." Nell Trenkle of Jennie Edmundson Hospital, Council Bluffs, led the round table discussion. The topics discussed were "What We Should Expect of Our Students," and the possibilities of bringing more dietitians into the field.

Following the afternoon meeting, the members visited Jennie Edmundson and Mercy Hospitals. Tea was served at Mercy Hospital. In the evening a joint dinner with the Iowa Hospital Association was enjoyed.

At the Tuesday morning meeting, Anna Boller, representing the National Live Stock and Meat Board, gave an illustrated talk on "Obesity." Miss Wilson, University of

Nebraska, presented a "Dietary Case Study for the Student Nurse." At the luncheon meeting, Lola Schmidt of Des Moines told of her experience in social service work. In the afternoon, a joint meeting with the hospital association was held when Dorothy Anderson discussed "Highlights from the Meeting of the Iowa State Dietetic Association."

The Memphis Dietetic Association, at their recent meeting, planned to work out a project of community education in the fall. The Memphis Dairy Council and Milk Board coöperated with the local association to secure Mrs. Ethel Austin Martin of Chicago as speaker at the meeting. Mrs. Martin addressed the group on "How to Make Dietetics Live in the Community." About a hundred attended the meeting, and all were enthusiastic over the plans for the classes to be offered for three groups, school lunchroom managers, parent teacher association members, and adult education in clinics, homes, etc.

The Michigan Dietetic Association held its annual meeting in Detroit, May 24 and 25.

The Minnesota Dietetic Association. At the May meeting officers were elected as follows: president, Marion Hodges, St. Andrews Hospital, Minneapolis; vice-president, Margaret Drew, St. Paul; recording secretary, Nell Dahl, University Hospital, Minneapolis; corresponding secretary, Adelaide Jury, General Hospital, Minneapolis; treasurer, Chrissa Wendt, St. John's Hospital, St. Paul. At the same meeting, three new members were accepted: Irma Boehme, Theon Halversen and Alberta Gurther. Activities for the year ended at a picnic at Lake Nokomis.

The Missouri Dietetic Association held its first annual meeting at Kansas City in May, with a registered attendance of sixty-one. Following a welcome from Ethel M. Ollis, President, Mabel V. Campbell of the University of Missouri spoke on "The Results of the C. W. A. Project in the Home Economics Field." Dr. E. H. Skinner of Kansas City was the luncheon speaker for that day. At the afternoon meeting Ruth Kahn spoke on "Interpreting Nutrition to the Case Worker." Mabel V. Campbell presided at the evening session. Papers were presented by Dr. Maurice Walker, on "Metabolism of Water," and Dr. William Merritt Ketcham on "Endocrine Obesity." On Saturday morning the following addresses were given: "The Dietitian as an Expert in Her Community," Mrs. Marie Harrington; "Diet in Heart Disease," Dr. R. C. Davis; "Relation of the Dietitian to the Training School," Esther H. Dersch; "Progress in Standards for Approved Courses," Edith Tilton. Trips were also made and exhibits were shown. Last year's officers were reelected as follows: president, Ethel Ollis, Kansas City Research Hospital; vice-president, Mabel V. Campbell, University of Missouri; treasurer, Louise Wilkinson, St. Louis County Hospital; and secretary, Ruth Kahn, Washington University Medical School Clinic.

The New Jersey Dietetic Association held its spring meeting in Jersey City in April. Following inspection of nurses' residence, kitchens and dining room of the Jersey City Medical Center, the business meeting was held, with Alberta Dent presiding. Dr. George O'Hanlon, medical director of the Medical Center, spoke on "Hospitals," following which Martha Alderman, director of the food clinic of the Pennsylvania Hospital spoke on "The Organization and Function of the Food Clinic." Informal discussion followed. Following the dinner, at which guests, including Florence Dakin, Dorothy De Hart and Adeline Wood, were introduced, Dr. Milton Bridges presented a paper on "The Modern Approach to Diet Therapy," and Alice McCollister spoke on "Personnel Management."

Sophia Morris, chief dietitian, Beth Israel Hospital, Newark, talked on "The Dietitian—Her Contribution as a Hospital Executive" at the meeting of the New Jersey Hospital Association at Atlantic City in June.

The New York State Dietetic Association. The fifth annual convention was held in Rochester, N. Y. May 14 and 15. May

Benedict, supervisor of food administration, Mechanic's Institute, and her students served a delightful tea Sunday afternoon. About fifty dietitians and friends attended.

Registration began Monday morning at the Rochester General Hospital. The program opened with a symposium on community education. Estelle Hawley, Ph.D., of Rochester, N. Y., discussed "Some of the Problems of Adequate Low Cost Family Dietary." Constance Hart, director of School lunches, Rochester, N. Y., gave a paper on "Adequate Low Cost School Luncheons," and Adeline Wood, New York City, discussed "Low Cost Special Diets to Meet Outpatient Needs."

Effie May Winger and her staff served a delicious lunch in the Rochester General Hospital. Greetings were extended from Virginia Ray, Laura Comstock, Christopher G. Parnall, M.D., May D. Benedict and Blanche Bohach.

The meeting in the afternoon was devoted to personal administration, "Fitting the Worker to the Job." Mr. A. B. Gates, Eastman Kodak Co., Rochester, discussed it "From the Standpoint of Industry," Mary De Garmo Bryan, Ph.D., Teachers College, "From the Standpoint of the Curriculum" and Edith Smith, Mt. Sinai Hospital, New York City, "From the Standpoint of the Hospital."

After these interesting discussions the dietitians drove through the beautiful parks to Highland Hospital for tea. The banquet was held at Oak Hill Country Club. We were fortunate to have as our speakers, Mrs. Quindara Oliver Dodge, president of the American Dietetic Association and Nathaniel Faxon, M.D., president of the American Hospital Association.

Tuesday morning meetings were held at the Strong Memorial Hospital. William S. McCann, M.D., professor of Medicine, University of Rochester Medical School, held a clinic concerning "Dietary Factors in the Regeneration of Serum Proteins."

Luncheon was served at Todd Union, University of Rochester Campus, after which John R. Murlin, Ph.D., Department of Vital Economics, spoke on "Vitamins and Hormones."

At the business meeting the following officers were elected: president, Grace Carden, Strong Memorial Hospital; vice president Ursula S. Senn, Buffalo City Hospital; secretary, Marcia I. Rosbrook, Syracuse Memorial Hospital; and treasurer, Emma Feeney, Pratt Institute, Brooklyn.

The recommended standard state constitution was discussed and adopted. Many of the members enjoyed trips through the beautiful parks. Rochester is indeed a city of beautiful flowers.

Philadelphia Dietetic Association. In February the association had the opportunity to hear Laura Comstock speak on the topic, "Nutrition in Industry." Miss Comstock gave an excellent interpretation of the program she is carrying out at the Eastman Kodak Company. An informal reception was arranged at the home of Anna de Planter Bowes so that all the officers, chairmen of committees and members of the executive committee might have an opportunity to meet Miss Comstock.

On February 27, Sadye F. Adelson and members of her committee presented "A Study of the Cost of Special Diets." Members of the County Medical Society and representatives of social and relief agencies were invited to this meeting and to participate in the discussion of this study. The results of the committee's efforts were made available to each association member and guest in mimeographed form. This publication is meeting a long felt need in Philadelphia and other communities in Pennsylvania.

On March 15 Dr. Gerald H. Pierson discussed in a most interesting manner "Thoughts and Emotions Which Are Connected with Food." Many members appreciated the opportunity to hear a psychiatrist discuss this topic.

On April 10, eighty-seven members attended the annual dinner and business meeting and election of officers was held. Mary E. Huhn, president of the Pennsylvania State Dietetic Association was the principal guest speaker. Marie O'Hara, state chairman of administration and D. O'Brien, chairman of the publicity section

THE following firms will offer new ideas, products and equipment of interest to the progressive institution dietitian, and to those in the fields of teaching and therapeutics. Make it a point to visit their booths during the Washington meeting.

BATTLE CREEK FOOD COMPANY—Battle Creek Health Foods

F. A. DAVIS COMPANY—Text and Reference Books

R. B. DAVIS COMPANY—Cocomalt and Baking Powder

J. B. FORD COMPANY—Cleansing Materials

GENERAL FOODS COMPANY—General Food Products—Frosted Products

GERBER PRODUCTS COMPANY—Gerber Products

HEINZ COMPANY—Food Products

HORLICK'S MALTED MILK CORPORATION—Horlick's Malted Milk, Powder and Tablet Form

JUNKET FOLKS—Junket Power, Tablets, Color and Flavotint

KELLOGG COMPANY—Cereal Products

SAM'L KIRK—Jullicum

KNOX GELATINE COMPANY—Gelatine

KRAFT CHEESE COMPANY—Kraft, Phenix Cheese—Mayonnaise Products

LIPPINCOTT COMPANY—Books

LOOSE WILES BISCUIT CO.—Biscuits

MACMILLAN COMPANY—Books

MELLIN'S FOOD COMPANY—Mellins Food—Mellins Food Biscuit

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The names of other firms exhibiting will appear in the September JOURNAL.

of the State Dietetic Association, were also guests and briefly discussed their work in the state association. The officers elected for the coming year were as follows: Grace Godfrey, president; Martha A. Alderman, vice president; Margaret Mason, secretary; and Mamie T. Kirk, treasurer.

Elizabeth Guilford of the Metropolitan Life Insurance Company was the guest speaker at the association's group meeting on community education of April 24. Miss Guilford told members how the home economics bureau of the Metropolitan Life Insurance Company functions.

Rose Baker was chairman of the meeting on administration held May 8 at the Drexel Institute. Mary A. Lindsley of the Dodge Hotel in Washington discussed factors contributing to success in hotel management.

The last meeting of the calendar year on May 28 included a trip to the Morris Arboretum of the University of Pennsylvania. Mrs. Kenneth Stuart of the University of Pennsylvania conducted a tour through the arboretum and discussed the principles of landscape architecture.

Members of the association worked in coöperation with the Pennsylvania State association in preparation for the state convention held at Buckhill Falls, Pennsylvania, June 1 and 2. A large group of Philadelphia dietitians attended this meeting.

The Tri-State Dietetic Association news letter for May gives a comprehensive picture of association activities in Tennessee, Alabama, Georgia and adjacent territory.

Utah State Dietetic Association held its May meeting at Saltair Beach. Twenty members enjoyed a box picnic lunch, following a dip in Great Salt Lake.

At the April meeting the following officers were elected: Georgia Crane, president; Ellen Smith, vice-president; Catherine Pier, treasurer; and Blanche Jones, secretary.

The organization has recently affiliated with the Utah Federation of Woman's Clubs.

Miriam Mantle is now dietitian at St. Mark's Hospital, Salt Lake City. Elizabeth Steelman Edris has gone to Seattle to make her home.

Ellen Smith is taking dietitian training at Presbyterian Hospital, New York City.

The Virginia State Dietetic Association met in April at the Jefferson Hotel, Richmond, Virginia. There were more members present than have attended a state meeting since the organization of the association.

The following officers were elected: president, Gertrude F. Brown, St. Luke's Hospital, Richmond; vice-president, Ruth K. Wright, Kings' Daughters' Hospital, Portsmouth; secretary, Kathryn Heitshu, Medical College of Virginia, Hospital Division, Richmond; and treasurer, Bertha Ide, Protestant Hospital, Norfolk.

The president has appointed as sectional chairmen: Administration, Clara Turner, State Teachers College, Harrisonburg; Diet Therapy, Mabel Gladdin, Medical College of Virginia, Hospital Division, Richmond; Professional Education, Aileen Brown, Director of Dietetics, Medical College of Virginia, Hospital Division, Richmond; Community Education, Eula Porter Robbins, State Nutrition Adviser, Richmond.

The members appointed to serve on the JOURNAL Current Comment Committee are: Administration, Clara Turner, State Teachers College, Harrisonburg; Diet Therapy, Kathryn Heitshu, Medical College of Virginia, Hospital Division, Richmond; Professional Education, Emaleen Graham, Medical College of Virginia, Hospital Division, Richmond; Community Education, Eula Porter Robbins, state nutrition adviser, Richmond.

Amalia Lautz, head of the Department of Dietetics and Home Economics, State Teachers College, Fredericksburg, has been asked by Fairfax Proudfit to serve as the Virginia member of the Placement Bureau Board.

Western Washington Dietetic Association. The first meeting of the 1933–1934 season was held at Harborview Hall, Seattle, in September. Most of the meeting was given over to the subject of relief work. Miss Myer spoke of the work being done by the King County Welfare Board, and Miss Tooke told about State Relief Work. A discussion

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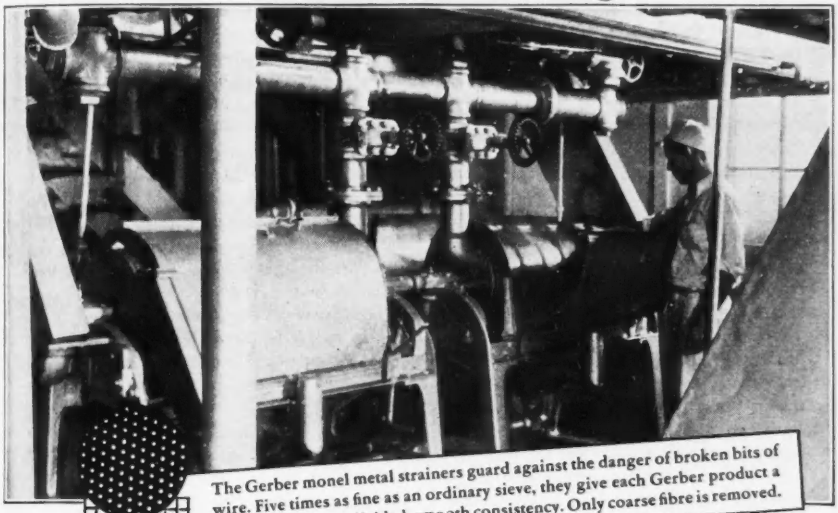

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of the manner in which the dietetic association would aid in the welfare work during the coming year followed. A brief business meeting concluded the program.

The next meeting was held in October at the Tacoma Hotel in Tacoma, and consisted of a banquet followed by a very interesting lecture and discussion by Dr. T. H. Duerfeldt on "Food Allergy and Elimination Diets." There was a short business meeting which included a report from the constitution committee.

The November meeting of the association was held at Harborview Hall in November, Alice Beaudreau, secretary, presiding at the business meeting. Dr. Jennie Rowntree, chairman of the education committee of the association, took charge of the rest of the meeting. Dorothy Goodrich gave an excellent report on the national convention. In the discussion of the relief work of the association, it was decided that the association would join the Health Council of Seattle and King County, so that the relief work done by members would be more organized and so that the association would receive credit for the work its members did. Dr. Rowntree discussed the teaching of dietetics to student nurses and explained several forms she had prepared for this purpose. The meeting was concluded by Mabel Flanley who spoke on "The Education of the Doctor and the Dietitian."

The December meeting was held at Harborview Hall. Following a short business meeting, Mary Northrup reported a meeting at Olympia, at which she represented the association, for the reëmployment of women. Dr. S. E. C. Turvey of Everett then spoke on "Obesity" and "Cholesterol Metabolism."

In January the association met at the Swedish Hospital Nurses Home, Seattle. Dr. Ward was the speaker of the evening. He explained the treatment of cancer by x-ray and radium, answered questions concerning his work, and took the members on a tour of the x-ray department of the hospital. Afterwards refreshments were served to members and guests.

In February the association met at Harborview Hall. Following a short business meeting, the members divided into two groups for round table discussion. The diet therapy section was led by Carletta Anderson and the administration section by Mary Northrup. Decision was made as to what part the association would take in the work of the national association this year.

The March meeting was held also at Harborview Hall. After the business meeting, members met with their section leaders for discussions of diet therapy and administrative problems.

On April 20 the association met at the Y. W. C. A. in Tacoma. After the dinner and business meeting Mr. Rideau of the Frederick and Nelson Department Store of Seattle showed pictures of a tour through the store and some scenes from the World's Fair.

The May meeting, a picnic, was the last of the 1933–1934 season. After lunch on the beach, a business meeting was held, at which the following officers were elected: Alice Beaudreau, president; Eleanor Wallace, vice-president; Edna Cox, secretary; and Alice Walker, treasurer, to take the place of Ruth Forsberg, Eva Hunt, Alice Beaudreau, and Nena Osterud, respectively.

Beginning this year, the section activities, diet therapy and administration, of the Western Washington Association have been scheduled for the calendar year, instead of from October to June, to correspond with the activities of the national association.

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WHO'S WHO IN THIS ISSUE

DONALD A. LAIRD, Ph.D., Sc.D. (Honorary) has had wide experience as a teacher at the University of Iowa, Yale and Colgate. Since 1925 he has been director of the Psychological Laboratory at Colgate. He is technical advisor to many commercial institutions and is a Fellow of the American Association for the Advancement of Science, and Society of Industrial Engineers. He is the author of several textbooks and of "Why We Don't Like People." Hilda Drexel, R.N., is a psychiatric nurse who has been assisting Dr. Laird in experimental work for the past ten years. She also assisted in the preparation of Dr. Laird's book, "Applied Psychology for Nurses."

E. F. KOHMAN received the A.B. degree from University of Kansas and his Ph.D. from Yale. He was associate in dairy chemistry at the University of Illinois from 1915 to 1917, then organic and physiologic chemist, Bureau of Chemistry, U. S. Department of Agriculture. He has been research chemist of the National Canners Association since 1919. Dr. Kohman has done notable work in the following fields: cause of vitamin C destruction in cooking; vitamins in canned foods, phenol-chlorine water contamination; and oxygen and other corrosive agents in canned foods.

SYBIL L. SMITH, assistant in Experiment Station Administration, United States Department of Agriculture, is well known to members of the Association for her research work in the field of nutrition. She is co-author with Henry C. Sherman of "The Vitamins."

J. W. VANDEN BOSCH obtained a practical knowledge of employment and personnel problems in the personnel department of one of Cleveland's larger manufacturing concerns during 1923 and 1924. While assistant labor commissioner for the Cleveland Chamber of Commerce from 1924 to 1928, he was secretary of the production managers group, made up of factory operating executives, and of the Employment Managers Association. He carried on the research and statistical work of the association, such as the monthly survey of employment in 100 Cleveland concerns, a semi-annual wage survey of clerical employees, and a special study published as "A Survey of Personnel Activities in 116 (Cleveland) Concerns."

IRA A. MANVILLE and F. G. CHUINARD were contributors to the March, 1933, JOURNAL. AVOCA S. MCMINIS received her B.A. degree at the University of Wisconsin. She is a candidate for the Master's degree and, at the time of this research, was Research Assistant in Nutrition.

CHILDREN GAINED 4.84 times as fast on MEAD'S CEREAL*

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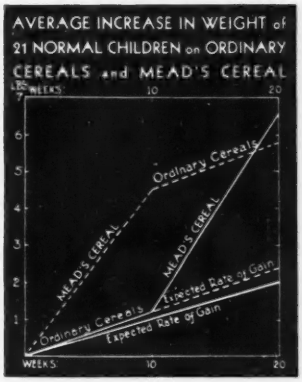
[1]Summerfeldt, P.: *Am. J. Dis. Child.* **43**:285-290; Feb. 1932.



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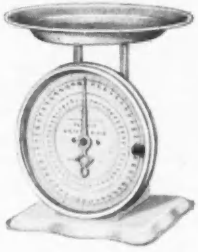

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Pregnancy, Diet and, M. L. Leventhal ..... .31
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By JOHN TAINE [Eric Temple Bell, Professor of Mathematics, California Institute of Technology]

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